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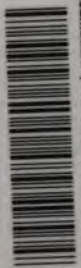
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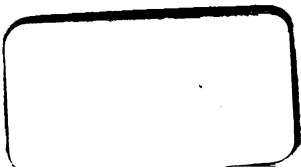
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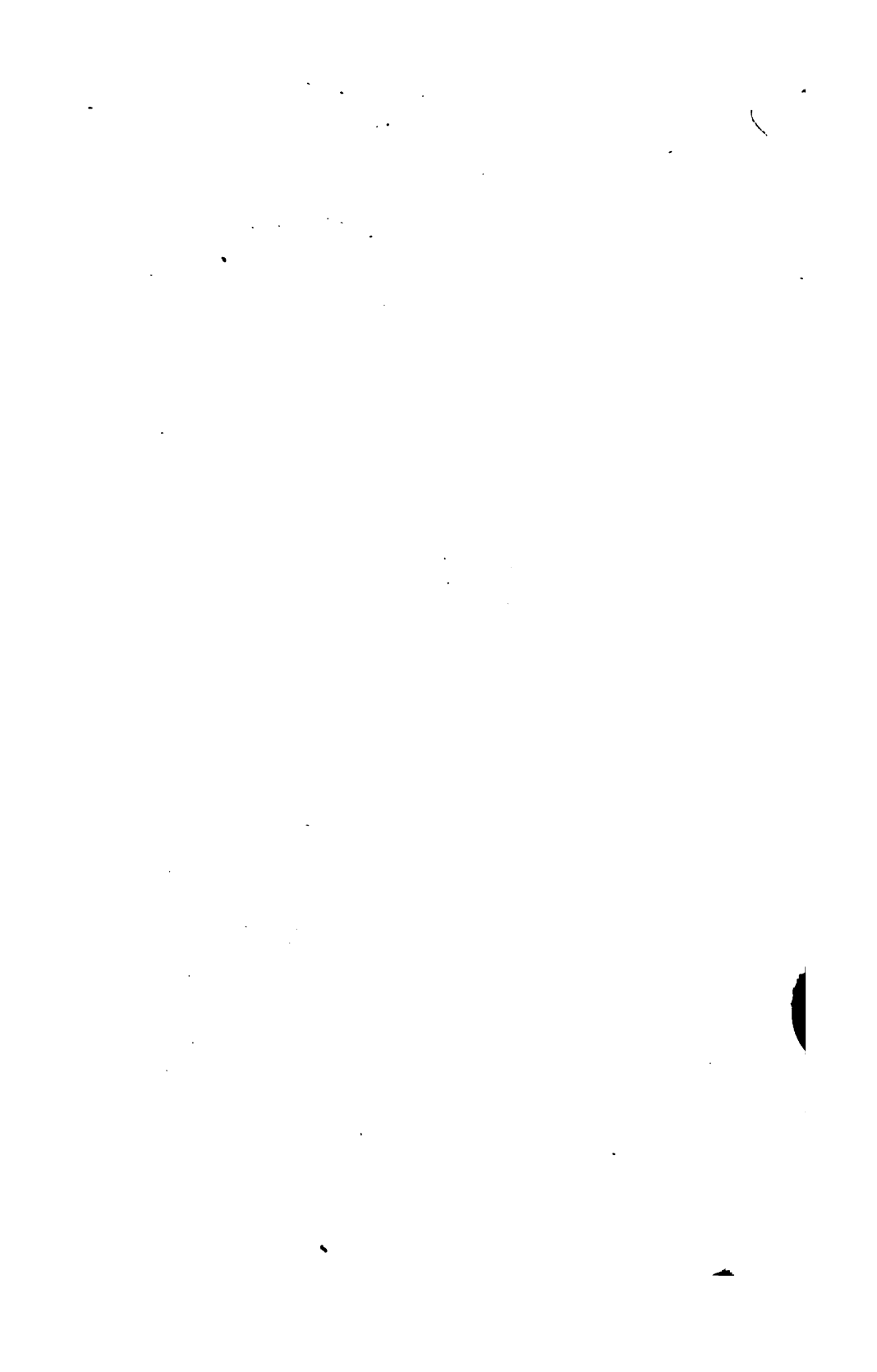
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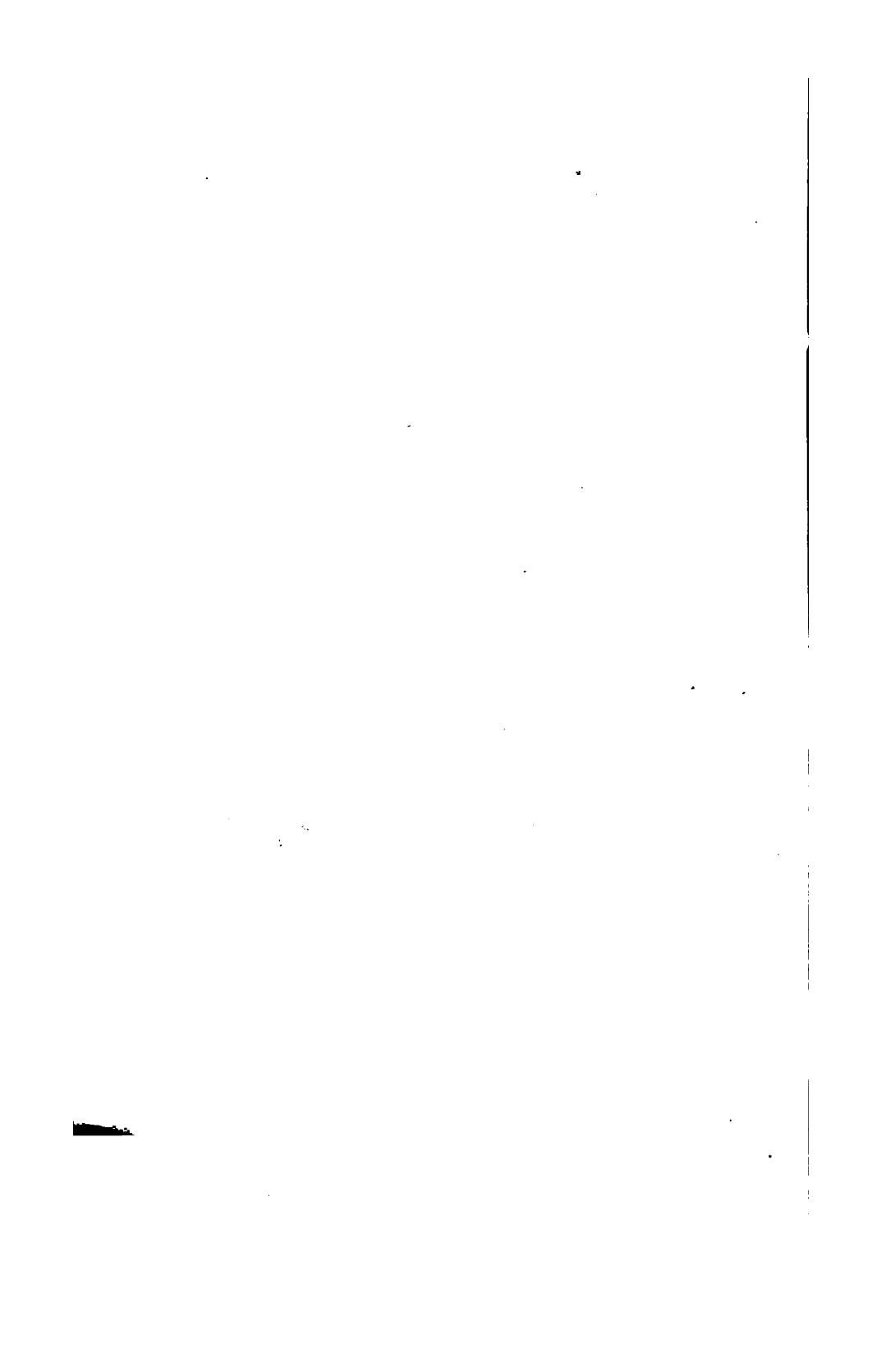




RHEUMATISM

AND

GOUT.



· RHEUMATISM:  
ITS NATURE, CAUSES, AND CURE.

GOUT:  
LANE LIBRARY  
ITS NATURE, CAUSES, CURE, AND PREVENTION.

BY  
JAMES AALEXANDER, M.D.  
MEMBER OF THE ROYAL COLLEGE OF PHYSICIANS;  
FELLOW OF THE ROYAL COLLEGE OF SURGEONS (BY EXAMINATION);  
ETC. ETC.



LONDON:  
JOHN CHURCHILL, NEW BURLINGTON STREET.

MDCCCLVIII.

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1858

## DEDICATION.

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To the Medical Profession, who prescribe for, and to the Public, who suffer from, (not the Profession, but) the maladies treated of in the following pages, I venture in all humility to dedicate this book; and if the principles advanced, and the facts adduced, should be the means of diminishing the anxieties of the one, and mitigating the sufferings of the other, my main object, "to do some good in my generation," will be attained.

JAS. ALEXANDER, M.D.

2, Suffolk Place, Pall Mall East,  
January 1st, 1858.



## P R E F A C E.

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A PREFACE, modestly stating the grounds on which the author presumes to emerge from the obscurity of private life, and embark on the stormy waters of publication, is deemed essential to every book. I shall therefore briefly state that the reasons which induce me to incur the anxieties and perils of authorship are, that during the first few years of my professional life, I was taught, as others have before and since been taught, by reading, lectures, and clinical instruction, to know rheumatism when I saw it; but I never could obtain any satisfactory explanation from any source as to the true nature of the malady—the cause, in fact, of those symptoms which taken in the aggregate constitute the morbid phenomena which we recognise as this disease.

My medical pastors and masters appeared, when appealed to for an explanation, to be involved in a kind of mental fog. One would rush boldly through by asserting “that it was

caused by inflammation of the fibrous tissues;" another would say "that it was no doubt dependent on the retention of lactic acid and its salts in the circulation." Very strong grounds for doubting the correctness of the first opinion have long existed; and after having searched long and hopelessly for any evidence of the retention of lactic acid and its salts, as the *materies morbi* of this affection, I was also compelled to abandon that theory, as based equally on a delusion and a myth. The doubts which arose during my pupilage followed me into practice, and I was never able to prescribe for a case of rheumatism without feeling that I was committing legalized quackery.

Numerous circumstances, which it is not necessary now to enter on, favoured the assumption that rheumatism was a blood disease; while the tenacity with which the disease clung for a time to particular joints or tissues, and then quitted them for others, made it equally manifest that local as well as constitutional causes exercised their due share in the development of this disease. The observation of Liebig that there was "every reason to hope that we may be enabled by a very simple chemical operation to reason backwards from the urine to definite conclusions as to the quality and composition of the blood,

and by the aid of which the physician may ascertain the changes in the composition of the blood in disease," led me to reconsider the nature of the urinary deposits, in both gout and rheumatism. The remarkable analogy which exists both in the character of the urine and of its deposits in these two diseases, and the striking points of resemblance in some respects between some of the symptoms of the two diseases and the equally remarkable discrepancy which existed between others, led me to infer that the two diseases depended on the formation of the same morbid matter, generated under different circumstances, and acting on opposite conditions of the blood. In order to arrive at any definite conclusion on these points, it became essential to obtain a more accurate knowledge of the laws of lithiasis, or the physiological principles which regulate the formation, retention, and ultimate deposition of lithates or urates in those tissues for which they have the greatest affinity. This necessarily must be to some extent a matter of conjecture, but my observations and the conclusions derived from them are embodied in the following pages; and however imperfectly they may be expressed, and however feebly they may be advocated, I offer them to the profession and the public, not with an assurance of their

infallibility, for that would be presumptuous, but with that strong conviction of their general correctness which a careful consideration of the subject entitles one to hold. Many men who form opinions, differing from those generally entertained on any given subject, are frequently deterred by the fear of criticism from giving them publicity; if all were influenced by this morbid sensibility, science would stand still. Criticism promotes discussion, discussion ventilates the facts and elicits truth, and it is by the truths of science that pathology becomes enriched and suffering humanity relieved. I therefore venture to publish this book, because I rely with confidence on the old saw,

*"Magna est veritas et prevalebit;"*

because I am somewhat sceptical of the supposed savage severity of reviewers, and because I believe in

*"The average justice of the popular din.  
If it is bad they will not take it in,  
Nor will it take them in."*

If, on the contrary, the principles are sound, they will conduce to the public good, and will not detract from my humble reputation.

It will be observed that I have avoided appending formulæ of prescriptions in the treat-

ment of these diseases. My reason for doing so is, that every well-informed professional man knows that he never sees two cases of either gout or rheumatism in which the symptoms are precisely alike, and in which the treatment that might be applicable in one case would not require to be very much modified to meet the exigencies of another; and although he might be willing enough to recognise the general correctness of the principles advocated in a treatise of this description, he would never think of adopting prescriptions from this or any other medical work for the treatment of diseases so variable in their character and peculiarities. The public, on the other hand, unacquainted with these circumstances, will use or rather misuse prescriptions in medical books; and they do so, not only to their detriment, but they bring discredit on the science of medicine in general, and the author in particular; and as I despair of attaining the *ultima thule* of medical bliss, and making "every man his own doctor," I have thought it better to adopt a conservative practice in this respect, by preventing as far as is in my power any man doing himself harm and laying the blame at my door. If rheumatism has been a constant source of doubt and difficulty to the pathologist, it must be admitted by all that

# ADDRESS

I have been some ~~numerous~~ <sup>months</sup> ~~in the~~ <sup>in the</sup> ~~last number of the~~ <sup>last number of the</sup> ~~Journal~~ <sup>Journal</sup> ~~to the best of my ability~~ <sup>to the best of my ability</sup> ~~bringing it into the arena of medi-~~ <sup>bringing it into the arena of medi-</sup> ~~cal discussion~~ <sup>cal discussion</sup> ~~I adopt the language of the~~ <sup>I adopt the language of the</sup> ~~Journal~~ <sup>Journal</sup> ~~"Don't let the Doctor"~~ <sup>"Don't let the Doctor"</sup> ~~Con-~~ <sup>Con-</sup> ~~tributions of my professional friends who hold~~ <sup>tributions of my professional friends who hold</sup> ~~to some distance with mine will sharpen~~ <sup>to some distance with mine will sharpen</sup> ~~the points which are pointed out will not require~~ <sup>the points which are pointed out will not require</sup> ~~to be referred to enter the lists of medical literature~~ <sup>to be referred to enter the lists of medical literature</sup> ~~and to assist with me in defence of their own~~ <sup>and to assist with me in defence of their own</sup> ~~views~~ <sup>views</sup> ~~To this I can offer no objection as I feel~~ <sup>To this I can offer no objection as I feel</sup> ~~assured that however much we may differ on~~ <sup>assured that however much we may differ on</sup> ~~points of physiology, pathology, or therapeutics~~ <sup>points of physiology, pathology, or therapeutics</sup> ~~we shall be unanimous in our desire to promote~~ <sup>we shall be unanimous in our desire to promote</sup> ~~the cause of truth, to elevate that science in~~ <sup>the cause of truth, to elevate that science in</sup> ~~which we have a common interest to rescue this~~ <sup>in which we have a common interest to rescue this</sup> ~~Journal from the empiricism which has hitherto~~ <sup>Journal from the empiricism which has hitherto</sup> ~~surrounded it, and to raise it to that position~~ <sup>surrounded it, and to raise it to that position</sup> ~~which from its importance it is entitled to hold,~~ <sup>which from its importance it is entitled to hold,</sup> ~~not merely within the pale of the Practice, but~~ <sup>not merely within the pale of the Practice, but</sup> ~~also of the Science of Medicine.~~ <sup>also of the Science of Medicine.</sup>

2, Suffolk Place, Pall Mall East,  
 January 1st, 1858.

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# RHEUMATISM

## ERRATA.

- Page 4, line 12, for "electric," read "elective."  
,, 101, ,, 21, for "separation," read "reparation."  
,, 185, ,, 10, for "alectics," read "aloetics."  
,, 234, ,, 14, for "discountenance," read "discontinue."  
,, 259, ,, 1, for "four," read "few."

pulmonary affections) scarcely any malady that so frequently demands the aid of the physician as that of rheumatism; there is scarcely any that is attended with so much suffering to the patient, that so obstinately baffles, at all events for a time, the best directed efforts of medicine to relieve it, and which, when relieved and even apparently cured, so constantly leaves behind it the germs of future, and only too often of fatal organic disease. It is, therefore, for each and

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# RHEUMATISM.

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## CHAPTER I.

Introduction—Frequency and obscurity of the disease—Opinions of Dr. Watson, Dr. Fuller, and the author—Urate of soda, probable materies morbi—Physiology of urea and uric acid—Liebig's theory in the main correct, but sufficient latitude not allowed for disturbing causes in both health and disease—Becquerel's tables of the comparative quantities of uric acid and urea, as quoted by the late Dr. Golding Bird, reconsidered—Practical conclusions to be drawn therefrom.

IN the temperate but ever-changing climate in which we live, there is (with the exception of pulmonary affections) scarcely any malady that so frequently demands the aid of the physician as that of rheumatism; there is scarcely any that is attended with so much suffering to the patient, that so obstinately baffles, at all events for a time, the best directed efforts of medicine to relieve it, and which, when relieved and even apparently cured, so constantly leaves behind it the germs of future, and only too often of fatal organic disease. It is, therefore, for each and

all of these reasons a subject of the utmost practical importance; and, as such, has doubtless on many past, and will again on many future occasions, occupy the serious attention of every practitioner of medicine, from the *patres conscripti* of the profession down to its youngest members. Our anxiety, however, when first called in to a case of acute rheumatism, is not alone dependent on the feeling that we have an obstinate, vigorous, and subtle foe to contend with—which may at any time leave the outworks in which it is temporarily located and entrench itself in the heart, the very citadel of life—but it is very materially enhanced by the conviction that our treatment of this disease has not hitherto been based on that sound and accurate knowledge of its true and precise nature which is essential in order to enable us to prescribe with confidence and success, and we cannot help admitting to ourselves, with a feeling very much akin to humiliation, that although we have no difficulty in diagnosing the disease—that although we are acquainted with its immediate exciting cause, and recognise it in the aggregation of symptoms then before us as rheumatism, we are still unacquainted with those changes which supervene on the application of the exciting cause, whether in the blood

or in the fibrous tissues themselves, or in both—and which, in fact, constitute the disease itself; and this feeling is in no degree diminished by the recollection that we have on some occasions, in the treatment of this disease, met with such success with one class of remedies as to lead us to believe that the difficulties we had heard described, and even ourselves seen in the treatment of rheumatism, were an exaggeration and a myth, and would in future disappear under the talismanic influence of the last new mode of treatment; and that we have, at another time, under apparently the same circumstances, found that the remedial measures which were previously adopted with so much success, have on subsequent trials proved so ineffectual as to compel us to admit that our knowledge of the true nature of this disease has hitherto been imperfect, and its treatment to a great extent uncertain and empirical.

The question which we first have to decide is, what is rheumatism? Dr. Watson, in his excellent work on the “Principles and Practice of Medicine,” describes rheumatism as inflammation of the fibrous tissues, but yet that it is not inflammation of the common kind; “at any rate it does not reckon among its events, as common inflammation does, either suppuration or gangrene. If sup-

puration sometimes occurs, and it certainly occurs very rarely, it is because the rheumatismal inflammation has extended to contiguous textures, and then has run the ordinary course of inflammation."

A little further on in the same lecture this eminent and able physician retracts, or at all events' modifies, this opinion in some degree, when he says, "In truth, acute rheumatism is a blood disease. The circulating blood carries with it a poisonous material, which, by virtue of some mutual or electric affinity, falls upon the fibrous tissues in particular, visiting or quitting them with a variableness that resembles caprice, but is ruled no doubt by definite laws, to us as yet unknown." Dr. Fuller, who is one of the most recent writers on this subject, believes with Dr. Todd, Dr. Prout, and others, that lactic acid, being retained in the blood instead of being eliminated by the skin, is the special *materies morbi* of the disease; that this *materies morbi* is generated within the system and not absorbed from without, and the development is called into play by any long-continued depressing influence upon the system. When the system is thus deranged, and rheumatic poison is present in it, any disturbing circumstances, even of temporary duration, such as over-fatigue, anxiety,

grief, or anger, by rendering the system more susceptible of its influence, may prove the accidental or exciting cause of the disease, and exposure to cold or atmospheric vicissitudes is almost certain to induce an attack. Dr. Fuller thinks that although the fibrous and fibro-serous textures are those which chiefly suffer, still, from its being a blood disease, all parts of the body must be more or less liable to be affected.\*

This view of the pathology of rheumatism is extremely ingenious and highly creditable to Dr. Fuller, but as my views on this subject are entirely at variance with his respecting lactic acid being the *materies morbi* of rheumatism, and as I dissent from Dr. Watson as to the existence of inflammation of fibrous tissues at all, I am unable to subscribe to the doctrines of either of these gentlemen. It is unnecessary to enter further upon the opinions of others; the controversy would be endless and the result useless. In no class of diseases is the old saying of *tot homines tot sententiæ* so applicable as in this; most men are content to say, "never mind what it is—can you tell us what will cure it?" A dozen different men would in all probability suggest as many different remedies. The want

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\* From Braithwaite's "Retrospect of Medicine," vol. xxvii.

of unanimity as to the nature of the malady, and the discrepancy which exists as to the most efficacious mode of treatment, amongst men well informed on professional subjects, and with whom, on most points, no difference of opinion would exist, is the most conclusive proof that the complicated and eccentric nature of this malady has hitherto enabled it to evade the efforts which have been made to show with scientific precision and certainty its true nature, in order that its successful treatment may be based, not as at present, on empirical traditions and observations, but on those rational principles which enable us to predict a cure not as a precarious probability but as a moral certainty. This great discrepancy of opinion, both as regards the nature of the malady and the most appropriate treatment of it, is in a great measure due to its having been regarded at one time as too exclusively dependent on an inflammatory condition of the fibrous tissues; at another time, and by another set of pathologists, as too exclusively dependent on the presence of a *materies morbi* in the blood; whereas I believe the true solution of the complicated nature of this malady and of its eccentric and variable peculiarities is to be found in the fact that cold and moisture, the commonly recognised exciting

causes of the disease, give rise to the formation at one and the same time both of the morbid matter and that peculiarly enfeebled condition of the fibrous structures that renders them prone to become the nidus of that morbid matter, and it is to the presence of this morbid matter in the circulatory system that the high vascular excitement which characterizes the disease is due, while the local symptoms are attributable to the accumulation of the particles of this irritating matter in the dense unyielding structures which are the especial seats of the disease.

I believe the urate of soda to be the *materies morbi* of both gout and rheumatism, and that the difference in form and degree between the two diseases depends, partly on the difference in the chain of events which has preceded and led to the formation of the morbid matter, and which has, at the same time, exercised an important influence on the character of the vital fluid itself, and partly to the different effect which this animal irritant exercises on two opposite conditions of the blood. This opinion is in some degree confirmed by the fact that in synovial rheumatism, which is popularly, and I think properly designated rheumatic gout, the constitutional symptoms partake in a greater or less degree of the character of

either gout or rheumatism, according to the extent to which the vital powers of the patient have been impaired from mal-assimilation of food, sedentary habits, hereditary predisposition, or any of those peculiar circumstances which generate that condition of the circulation most favourable to gout; we, moreover, see that in both diseases the morbid matter follows the same general law in fixing its habitat in those particular fibrous tissues which possess the lowest degree of vitality, whether that impaired vitality arises from the depressing influence of cold on structures at all times possessing a low degree of organization, or from their having been the seat of recent disease or injury, or from their being furthest removed from the centre of the circulation. But before entering on the pathology of either of these diseases, it is essential to consider, and if possible arrive at, some definite conclusion on that *quæstio vexata*, the physiology of urea and uric acid.

The origin of urea and uric acid is one of those mysteries of vital chemistry which the light of modern science has hitherto been unable to penetrate. That they are the means by which both effete nitrogenous matters which have already discharged their office in the animal economy, and by which superfluous nitrogenous

elements arising from an excess of nitrogenous ingesta or from imperfect animalization of the chyle are eliminated from the circulation, there can be no doubt. It is equally certain, from their absence in the chyle and from their presence in the blood in small quantities, even in health, as proved by the researches of Dr. Garrod, that although the nature and quantity of the ingesta, and defects in one or all the functions of chymification, chylication, and sanguification which constitute the primary assimilation of Dr. Prout may increase the quantity of both urea and uric acid, and alter their healthy and relative proportions to each other, that they are the immediate products of vital changes which take place during the second stage of the secondary assimilation of Prout, or the metamorphosis of tissue of Liebig.

The theory of the formation of urea which is at the present day generally taught, although it is very universally doubted, is that of Liebig, who considers that uric acid is the primary product resulting from the action of oxygen on nitrogenous elements which have already discharged their office in the animal economy, and that urea is the secondary product arising from the action of oxygen and water on the uric acid. He says—"When uric acid is subject to the action

of oxygen, it is resolved into alloxan and urea; a new supply of oxygen acting on the alloxan causes it to resolve itself either into oxalic acid and urea, or into oxaluric and paraboric acid, or into carbonic acid and urea." Such may be the behaviour of uric acid when exposed to the influence of oxygen in Liebig's laboratory; it is probable also that such is the behaviour of uric acid in the vital laboratory of the circulation, as all experiments tend to show that the more perfectly the various oxidizing processes are fulfilled, the less becomes the quantity of uric acid excreted in the urine, and the greater the quantity of urea; and conversely, the more imperfectly oxidation is carried on, the uric acid increases at the expense of the urea.

These remarks are only applicable to that state of health in which the decarbonizing organs are capable of excreting the products of that oxidation which has been carried on in them. During health they are capable of doing this; in disease they very frequently are not, and hence has arisen that apparent practical refutation of the ingenious and important discovery of Liebig which was advanced by the late Dr. Golding Bird. That lamented and talented physician thought that clinical research, so far from substantiating, seemed rather to refute the

arguments and assumptions of Liebig, and in corroboration of this assertion he adduces a table compiled by Becquerel, with the following remarks—"The labours of Edmund Becquerel in urinary pathology furnish us with a mass of carefully recorded observations, which, made with no view of supporting or disputing any preconceived notions, are peculiarly liable to respect. The numbers in the following table are calculated from some of the analyses alluded to, and point out the actual quantity of uric acid and urea excreted in the twenty-four hours, and the relative proportions they bear to each other in several diseases.

	Quantity in 24 hours of		Ratio of Uric Acid to Urea.
	Uric Acid.	Urea.	
Healthy urine, Becquerel's average . . .	8.1	255	1:31.48
Chlorosis, minimum of five cases . . .	1.8	77.5	1:43
Chlorosis, maximum of five cases . . .	6.	172.0	1:29
Pulmonary emphysema, extreme dyspnœa . . .	4.9	172.	1:35.1
Phthisis tubercles softened . . . . .	9.1	66.7	1: 7.33
Phthisis three days before death . . . .	9.8	29.4	1: 3.0
Morbus cordis with icterus . . . . .	9.82	73.3	1: 7.6
Acute hepatitis with icterus . . . . .	11.18	61.6	1: 5.6
Icterus . . . . .	17.75	285.6	1:16.1
Milk fever . . . . .	19.	133.	1: 7.47"

If we are to look at the mere chemical results, as shown by this table, they would to a great extent be subversive of Liebig's theory; but these results have been regarded too exclusively

in a mere chemical light, and too little attention has been devoted to the physiological and pathological causes which have induced an excess of uric acid and a deficiency of urea. In both health and disease an intimate sympathy exists between not only all the great decarbonizing emunctories, the lungs, skin, and liver, but also between these organs and the kidneys. This sympathy is evinced when any circumstances arise which interfere with, or diminish, or increase the action of one set of organs; there is then a corresponding increase or diminution in the others, so as to maintain a healthy balance in the nature and quality of the circulating fluid. At a high temperature the cutaneous exudation in the shape of perspiratory fluid is increased and the quantity of urine diminished. We know that the perspiratory fluid is not pure water, but that it contains ammoniacal and other salts in considerable quantities, and we also know that a vast amount of carbonic acid is constantly exhaled from the skin, and we invariably find that when cutaneous exudation is diminished by the application of cold and moisture, the quantity of uric acid increases and urea diminishes. Now this vicarious action which the kidneys assume under enfeebled cutaneous action must be due to one of two circumstances:

either the process of oxidation in the systemic capillaries must have been less perfectly effected, and the *débris* of the effete muscular tissues have only been partially oxidized, and carried into the circulation to be filtered off by the kidneys as uric acid, instead of the more perfectly oxidized and soluble urea; or, assuming the oxidation to have been perfectly effected, and the albuminous tissues duly oxidized into the more soluble urea, they must, by recombining with the retained carbonaceous elements which have not been so efficiently eliminated as they should be, owing to the deficient cutaneous action, have become reconverted into uric acid. Chemical analyses of the urine in various diseases, considered conjointly with the phenomena which characterize them, fully justify us in assuming that sometimes by one, sometimes by the other of these means, the kidneys, which are the great emunctories for nitrogenous excreta, lend assistance to the great decarbonizing organs when, enfeebled or overworked either from accident or disease, they become unequal to their ordinary duties.

In order to test these views we will take the table of diseases recorded by Becquerel and quoted by Dr. Golding Bird. First, according to Becquerel, the average of uric acid as compared

to urea in healthy urine is 1 to 31·48. Many experiments are recorded to prove that the more efficiently the various decarbonizing processes are effected, the greater becomes the quantity of urea and the less the quantity of uric acid excreted; it will answer the purpose sufficiently to quote one or two. Dr. Gairdner made some experiments on the night and morning urine of a gentleman subject to gout, but at the time of the experiment free from the disease, and he thus gives the result of his observations:—

1. Morning urine . . . . .	sp. gr. 1·023
Uric acid . . . . .	0·92 in 1000 parts.
Urea . . . . .	24·00 „ „
Ratio of uric acid to urea 1 to 25.	
2. Afternoon urine . . . . .	sp. gr. 1·018
Uric acid . . . . .	0·4 in 1000 parts.
Urea . . . . .	18·0 „ „
Ratio of uric acid to urea 1 to 45.	

During sleep respiration, and consequently oxidation, is less efficiently performed; hence we find nearly double the quantity of uric acid in the morning urine compared to that which exists when oxidation is more efficiently maintained. Professor Lehmann found that while living on a mixed diet of animal and vegetable food, and taking active exercise, the proportion of uric acid to urea was 1 to 77, but that in a state of rest, while living on the same diet, it was in the

ratio of 1 to 38, or rather more than double. Dr. Day relates the case of a man in training to run a race; the urine was examined before and after running, with the following results: before running, the uric acid bore to the urea the ratio of 1 to 9·3; after running, it had fallen to 1 in 34.

In all warm-blooded, rapidly respiring animals, in whom oxidation of blood is rapidly and efficiently performed, urea is found in large quantities in the urine, and uric acid only scantily. In serpents, lizards, and all reptiles of torpid habits and feeble breathing powers, uric acid alone is found; in the pig urea alone is found, and the late Dr. G. Bird was at a loss to reconcile this fact with the correctness of Liebig's theory, as he could not understand how perfect oxidation could be going on contemporaneously with the copious formation and deposition of fat; but we must remember that the pig possesses not only very powerful digestive and assimilating organs, and rapidly converts the carbonaceous elements of the vegetable food on which he principally lives, into fat—the only tissue it is capable of forming—but owing to the thinness of the skin and the absence of any hairy covering to that organ in this animal, destructive assimilation of tissue—on which the formation of urea and the disappearance of uric acid depends—

is most efficiently performed; and on the contrary in birds, in whom the thick feathery covering prevents the cutaneous evolution of carbonaceous impurities, and in whom the kidneys have to discharge the depurative duties of the two organs, the skin, and kidneys, we find uric acid alone. The first disease on Becquerel's list, chlorosis, gives in the minimum of five cases, uric acid in the ratio of 1 to 43; in the maximum of five cases, 1 to 29; the average would exhibit no great deviation from the healthy standard.

The slight departure from the standard of health that does occur is probably due to the deficiency of fibrine and of nitrogenous elements in the blood; oxidation of tissue goes on slowly but effectually, and, owing to the enfeebled state of the circulation, absorption takes place with rapidity, and the urea that is formed is rapidly filtered from the circulation. Although the oxidation of tissue is slight under this weak circulation, and the quantity of urea is below the average, still it is relatively in excess, but that excess is not always to be relied on. The heart is very irritable in this affection, and if the patient is exposed to excitement, and the circulation accelerated, there will certainly be an excess of urea, and a deficiency of uric acid, as

compared with the healthy average; but if the patient remains in a quiescent state and unexposed to excitement, exactly the reverse will be found. In the next disease, pulmonary emphysema with extreme dyspnœa, there is again an excess of urea as compared to the uric acid, although an absolute deficiency as compared to the usual averages; but here the dyspnœa is dependent on mechanical obstruction, and caused by the blood being sent into the air-cells more rapidly than it is returned; the absorption of oxygen in the lungs is in excess rather than not; owing to the blood being retained longer than it should be in the air-cells, and, owing to the increased absorption of oxygen which there takes place, destructive assimilation is very effective as far as it goes, but it is not carried to a great extent, for dyspnœa prevents that exertion which would promote it, and we find under this complete though diminished metamorphosis of tissue, an excess of urea as compared with uric acid. In the next disease, phthisis, tubercles softened, urea is both absolutely and relatively much below the average of health, and uric acid both absolutely and relatively above it; but in this consolidated condition of the lungs a large portion of it is absolutely lost for the purposes of respiration, the absorption of oxygen is much below the

average, and destructive assimilation consequently very feeble, and the kidneys being called on to atone, as far as they are able, for the imperfect decarbonizing power of the lungs, render that assistance by the excretion of uric acid—a substance more rich in carbon than urea; for we find that in this condition of lung, uric acid exists in the ratio of one to seven, nearly five times its normal proportions.

The next disease on Becquerel's table is phthisis three days before death, and here we find, when oxidation is going on with intense rapidity and all the tissues of the body being burnt up under its all-devouring influence, that the quantity of uric acid excreted during the twenty-four hours is 9·8 grains, and that of urea 29·4, the ratio of uric acid to urea being one to three, uric acid being in excess ten times above the standard of health: but the increase in uric acid is not merely comparative but absolute; nearly a fourth more being excreted than in health, while only one-ninth the quantity of urea is eliminated. These results would at the first glance appear to be entirely subversive of Liebig's theory, but if we examine more closely into the reason why this occurs, it will, I think, both tend to show that we do not allow sufficient latitude to Liebig's views, and it will also tend to show that uric acid

is sometimes a secondary product; or in other words that the nascent urea, meeting in the circulation with carbonaceous impurities, the products of excessive oxidation, which are unable to escape from the circulation by the ordinary emunctories, becomes reconverted into uric acid, and by the compensatory action thus set up, the kidneys assist the incapacitated lungs and the overworked skin and liver in getting rid of the carbonaceous products of excessive oxidation. This opinion is confirmed when we look at the relative chemical composition of uric acid and urea.

	N.	C.	H.	O.
Uric acid . . . .	2 ...	5 ...	2 ...	3
Urea . . . . .	2 ...	2 ...	4 ...	2

It will be seen that the chief chemical difference in the composition of these two bodies consists principally in the very much larger quantity of carbon contained in uric acid than in urea, and we thus see how perfect oxidation will tend to diminish one and increase the other. Now, if the kidneys can take on compensatory action for the lungs and skin, as we know they often do in the elimination of aqueous excretion, why should not the same assistance be extended to the carbonaceous constituents of those excretions? I believe it is so extended, and that uric acid is the shape in which the kidneys give that assistance to

the great decarbonizing organs, when their functions are impaired, and when they have to take on compensatory action to atone for their deficiencies. We must now revert to Becquerel's list, to show how this excess of uric acid takes place in the urine during the last stages of phthisis.

When the ulcerative stage of phthisis has fairly set in, and the protective influence of the mucous membrane is thus lost, oxidation goes on with intense rapidity, a considerable portion of the lung tissue has been lost, and the remainder is unequal to the task of eliminating all the carbonaceous elements resulting from this excessive oxidation. Notwithstanding the profuse perspiration that is set up to assist the lungs, we find the venous blood still loaded with carbon, as shown by the profuse bilious diarrhoea set up, and the great hydro-carbonaceous reserves stored up in the liver from excess of materials sent to it for the elimination of bile, which the overtasked organ is unable to convert into its normal excretion, and which, as a *dernier ressort*, deposits itself in the shape of fat; and hence the curious and extensive deposit of that substance in this organ, while every other is undergoing rapid emaciation, and which we are in the habit of recognising as a common *post-mortem* appearance in the fatty liver of phthisis.

But, notwithstanding the profuse colliquative perspiration and diarrhoea, and the fatty deposits in the liver, the blood is still loaded with carbon—the product of excessive oxidation, and which the disintegrated lung tissue, notwithstanding the active aid of the skin and liver, is unable to throw off—the kidneys are called on as a last and never-failing friend—a portion of the carbonaceous products of excessive oxidation reconverts the nascent urea into uric acid, and hence the appearance of that substance in the urine in the ratio of ten times its normal proportion, as compared with urea. The next disease on Becquerel's table is morbus cordis, with icterus: now morbus cordis is a somewhat vague term; but from the fact of its being accompanied by jaundice, we may assume that it is a valvular disease, and that the jaundice is merely one among many symptoms of distal venous congestion; and we here find that the ratio of uric acid to urea is 1 to 7·6—uric acid, as compared to urea, being in excess in the ratio of  $4\frac{1}{2}$  times its proper proportion. The process of decarbonization is here again interfered with, partly by venous congestion, as well as by the sedative effect of retained bile. The next disease is acute hepatitis with icterus, in which the ratio of uric acid to urea is as 1 to 5·6, the uric

acid being in excess of the standard of health in the proportion of 6 to 1: but here again decarbonization is defective, not merely from the presence of retained bile, but the breathing is in a great measure thoracic, for the patient dreads the pressure of the diaphragm on the inflamed organ, and uses his abdominal muscles as little as possible for the purposes of respiration. The next disease is icterus: here the ratio of uric acid to urea is 1 to 16·1, being about double the quantity of uric acid, compared to urea, that is found in healthy urine, but relatively one-third less than exists in acute hepatitis with jaundice, and one-half less than is found in heart disease with jaundice. The comparative quantities of uric acid and urea in these three last diseases show in a remarkable manner that retained bile alone, although doubling the normal quantity of uric acid, is not nearly so influential in this respect as when retained bile is combined with other maladies which interfere with the due decarbonization of the blood during the functions of circulation and respiration. In milk fever, the last disease in Becquerel's list, the ratio of uric acid to urea is 1 to 7·47, rather more than four times the normal proportion. The defective action of the skin in this, as during the hot stage of all fevers,

is the cause of this increase in the proper quantity of uric acid as compared with urea; and the reason why is this:—during the hot stage of fevers the process of oxidation is excessive, but the elimination of the products of that oxidation is defective; the hot and dry skin of fevers is too commonly known to require even a passing remark; while the heart is stimulated to increased action, the capillaries seem to have lost their power, and that portion of the carbonic acid which should be carried off with the sebaceous fluid, is retained to form fresh combinations, and seek fresh means of exit from the circulation. We have now gone through Becquerel's tables, adduced by the late Dr. Bird for the purpose of disproving the correctness of Liebig's theory; but I think, by allowing that latitude to Liebig's views in certain diseases, which their peculiarities demand—a latitude not inconsistent with, but rendered essential by, the phenomena which occur in those diseases—we are able to account for the presence of uric acid in excess, not only when the various decarbonizing processes are imperfectly performed, but even when super-oxidation exists, as in fever and phthisis. And where the carbonized products of oxidation are generated so largely that the ordinary emunctories, the lungs, the liver, and

the skin, are unequal to their elimination as rapidly as they are formed, they are consequently retained in the circulation, and form fresh combinations. Hence uric acid; and hence the mode in which the kidney fraternizes with its brother-scavengers, the lungs, the skin, and the liver, in the purification of the highways and byways of our bodies from those nitro-carbonaceous impurities which have already served their purpose in the animal economy, and which, by their accumulation and retention in the circulation, would, were it not for the compensatory and vicarious action thus set up by the kidneys, be productive of derangement, disease, and death.

The practical conclusions to be drawn from the foregoing observations are, firstly, that uric acid and urea being derived from the action of oxygen on the albuminous textures of the body, and from such albuminous constituents of the food as are imperfectly assimilated, or are in excess of what is required, it follows that whatever tends to check any of the great oxidizing processes, or leads to the accumulation in the circulation either of an excess of albuminous elements, or interferes with their due assimilation, will lead to the formation of an excess of uric acid, and a comparative deficiency of urea. Secondly, that the existence of excess of uric

acid sometimes occurs where metamorphosis of tissue is taking place with great rapidity, and the carbonized products of that oxidation, unable to escape, owing to impaired action of their ordinary emunctories, are retained, and form fresh combinations, by reconverting urea into uric acid. Thirdly, there appears to be grounds for believing that under rapid but imperfect oxidation of tissue the semi-metamorphosed elements of albuminous textures are occasionally carried into the circulation in an imperfectly oxidized state, as several stages must intervene between the nitrogenous tissues and their combinations with carbon, as they exist from the time they are first exposed to the action of oxygen as muscular tissue and their final elimination in the form of urea. The albumen of blood and the fibrin of flesh contain the largest quantity of carbon combined with nitrogen of all the animal compounds, and urea the smallest.

## EQUIVALENTS.

Albumen of blood . . . 1 of Nitrogen for 8 of Carbon.			
Albumen of flesh . . . 1	"	"	8 "
Fibrin of flesh . . . 1	"	"	8 "
Inosinic acid . . . 1	"	"	5 "
Glyocoll . . . . . 1	"	"	4 "
Kreatine and Kreatinine . 1	"	"	2 $\frac{1}{2}$ "
Uric acid . . . . . 1	"	"	2 $\frac{1}{2}$ "
Allantoine . . . . . 1	"	"	2 "
Urea . . . . . 1	"	"	1 "

We thus see that the series of nitro-carbo-naceous compounds in the body begin with albumen and end with urea. Albumen being the form in which nitrogen is combined with the largest amount of carbon, affords the greatest amount of pabulum for the inhaled oxygen, and in proportion as that process of oxidation is carried on in perfection, we have albuminous substances undergoing reduction into the lower compounds. From inosinic acid downwards, these compounds have no longer an organized form, but are crystallizable.

## CHAPTER II.

Cold and moisture check oxidation of tissue, and thus generate uric acid—Reasons for supposing rheumatism a blood disease—Reasons for supposing the urate of soda the *materies morbi*—Enfeebled condition of fibrous tissues essential for the development of the disease—Cold and moisture much more favourable to the induction of rheumatism than cold alone—All debilitating circumstances predispose—Effects of cold most severely felt while in a state of exhaustion—Although the symptoms vary in intensity in every case, they are sufficiently uniform to show their dependence on the existence of same causes—Dr. Taylor's observations, showing the relative frequency of fatal pericarditis in Bright's disease and acute rheumatism.

IN rheumatism, owing to the influence which cold and moisture exercise in checking oxidation in the systemic capillaries, uric acid is not oxidized as it otherwise should be into urea. The formation of uric acid from cold and moisture is not necessarily followed by rheumatism. Where the application of cold is only slight, but a moderate amount of uric acid is formed, which unites with the ammonia of the phosphate of soda and ammonia of the blood, and forms the urate of ammonia, which is seen as the red brick-dust deposit of the urine of persons suffering from a common cold. When the checked action

of the skin is more severe and more prolonged, uric acid is formed in larger quantities, and the soda of the tribasic phosphate of soda then yields to the uric acid, and the urate of soda is formed. The presence of this powerful animal irritant in the blood gives rise to great constitutional excitement, under which the oxidation of tissue takes place with greater rapidity than perfection; in other words, under this highly excited vascular action a portion of the products of oxidation are carried into the circulation before the process is completed, and fresh urate of soda formed; thus the morbid matter is, under this increased vascular excitement and oxidation, constantly being renewed. In gout, imperfect oxidation of the blood is the result of repletion; that imperfect oxidation also leads to the formation of uric acid, and subsequently of the urate of soda in excess; but a life of inertia and indulgence, while engendering this repletion, has also induced an impure condition of the blood, on which this powerful animal irritant is incapable of producing the same stimulating influence that it does in rheumatism, where the blood was previously in a state of vital purity.

The indications of treatment are in both diseases the same as far as relates to the object to be attained—perfection of oxidation. In rheu-

matism, at all events acute rheumatism, this perfection is to be attained by checking the rapidity with which it is carried on. In gout, on the other hand, our whole treatment is directed to the attainment of more perfect oxidation, by promoting its rapidity.

Many circumstances concur to induce us to believe that the peculiar symptoms of rheumatism are attributable to the presence in the blood of an unnatural and morbid matter, and that that morbid matter is the urate of soda. In the first place, it is evident, from the constitutional symptoms preceding the local ones, that they are not due to the local affections; secondly, the local symptoms are not fixed and permanent, but shift from joint to joint, and from one fibrous structure to another, as evinced by the phenomena of metastasis; thirdly, the symmetrical tendency which is so remarkably evinced in this disease, which was first pointed out by Dr. Budd, is strongly corroborative of the dependence of many of the symptoms of this disease on the existence of a poisoned condition of the blood; fourthly, the copious formation and deposition of urates in the urine contemporaneously with the disease, and their absence on the cessation of the symptoms, together with the, in some respects, striking resemblance of the symptoms to those

of gout, which depends on the existence of the same morbid matter, generated under different circumstances, and in an opposite state of the blood. To which may be added the fact, that the two diseases sometimes assimilate each other so closely, as we see in rheumatic gout; the symptoms of either disease preponderating according to the degree and extent to which the vital purity of the blood has been impaired by mal-assimilated food, retained bile, or any of those causes which produce that impure condition of the blood peculiar to the gouty.

That the urate of soda is the probable morbid matter may be gathered from the following facts:—First, that the disease is to a great extent hereditary, occurring in families in whom the lithic acid diathesis is very strongly marked; secondly, the occurrence of an attack is not unfrequently preceded by circumstances which have led to a more rapid metamorphosis of tissue than ordinary, and the application of the exciting cause, cold and moisture, at this time, by checking cutaneous action, impedes that perfect conversion of the effete albuminous elements into urea; they are thus only partially oxidized into uric acid, which is generated in large quantities; thirdly, the simultaneous cessation of excessive deposits of urates, and the approach of

convalescence. But rheumatism is not a disease of the blood alone, for we find that the urates may be largely deposited in the urine without the agonizing pain and the severe constitutional circumstances that attend rheumatism. We see this every day. A man has a severe cold, a good deal of febrile disturbance, heat of skin, and large depositions of urates of soda and ammonia; he may have the febrile excitement and no pain; in other words, febrile excitement depending on the application of the same cause and the generation of the same morbid matter in a less degree, but no rheumatism; clearly showing that rheumatism is not simply a blood disease. It is essential to the peculiar symptoms of rheumatism, that the circulation through the particular structures which become the nidus of the morbid matter should have been weakened and impaired by the depressing influence of cold. The *vox populi*, which attributes rheumatism to damp sheets, damp clothes, &c., recognises, quite as strongly as professional observation the fact that moisture as well as cold is essential to the generation of the disease. Cold, *per se*, acts primarily, and when not excessive, as a tonic and astringent; and its application, when in a state of health, is followed by that exhilarating reaction which we describe as a com-

fortable glow. When the application of cold is more intense or more prolonged, it acts as a direct sedative; but cold air, if dry, although much more intense in degree, does not appear so favourable to the induction of rheumatism as a very much higher temperature when combined with moisture. The reason is, that water is a much better and more rapid conductor of heat than air; a given amount of cold will therefore, when combined with moisture, abstract more heat, and reduce the vitality of a part more rapidly than a much greater degree of cold uncombined with moisture. We find that the army medical statistics confirm these views, and that rheumatism is in Canada, where the air is very cold but very dry, a disease of much less frequent occurrence than at the Cape of Good Hope, where the geranium and myrtle are outdoor plants. It will naturally be asked, if cold and moisture are the exciting causes of the disease, how is it that of a number of persons exposed to the same exciting cause, only a fractional portion shall suffer from rheumatism? The answer is, simply because the predisposition exists in only a limited number; that predisposition is dependent on the existence in the circulation at the time of the application of the exciting cause of a larger quantity than common

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of partially disintegrated albuminous elements, the product either of rapid oxidation of tissue, resulting from previous and recent strong exercise, or the *débris* of mal-assimilated nitrogenous food, which, owing to some defect in the vital chemistry of digestion, has never attained that high and complete degree of elaboration which is essential for the reparation of the animal fabric, and consequently remains in the circulation until it can be finally eliminated by the kidneys. But in order to induce an attack of rheumatism, it is essential not merely that the astringent effect of the cold should be felt in checking capillary action and corresponding perfection of oxidation—under which uric acid is generated in excess—but it is also essential that the sedative effect of the cold should exist in that degree that will induce the peculiar and enfeebled condition of the circulation through the fibrous structures which render them liable to become the habitat of the morbid matter. But the depressing influence of cold is not felt by all alike, nor equally by the same persons under different states of health, nor even in the same state of health under different circumstances.

The tendency which rheumatism has to attack individuals in whom the nervous energy has been impaired by exhausting and debilitating

circumstances, and the obstinacy of the malady in such cases, is evinced by the frequency and obstinacy of this disease in persons whose vital powers have been reduced by prolonged lactation or gonorrhœa, and who are consequently less able to bear up against the sedative effect of cold on these feebly-organized structures. But rheumatism does not attack this class of persons only. It is in its acute form, and of that we are now supposed to be speaking, not uncommonly a disease of the young and robust; and we now and then hear people say—"Oh! his blood is too poor; he'll never have the gout; it must be rheumatism." Now rheumatism does not depend on poverty, but *purity* of blood. Its vital integrity has not been impaired by the long-continued accumulation and retention in the circulation of those effete nitro-carbonaceous elements, in the shape of retained bile and urea, the products of repletion, and which act as such powerful depressants both on the nervous and vascular system, that they at last engender so impure and enfeebled a condition of the blood, that even the presence of a powerful animal irritant, like the urate of soda, is unable to do more than get up the semblance of excitement: for gout is to all intents and purposes a disease of irritability and debility, and very different to

the high constitutional excitement of rheumatism, which arises from the same morbid matter acting on blood in a high state of vital purity. But we are digressing from the consideration of the influence which cold and moisture have in the induction of the disease. The ill results of cold and moisture applied to the surface in young and healthy persons are *nil*, provided always that they keep in vigorous exercise, and that they change their clothes as soon as that exercise ceases. It is by sitting in wet clothes while the body is undergoing the process of cooling, that the sedative and depressing influence of cold is most powerfully felt, not only in diminishing the nervous energy already exhausted by excessive exertion, but by at the same time checking the carbonaceous excretion from the skin at the time when the quantity of effete nitrogenous matter has been largely increased by the rapid metamorphosis of tissue resulting from strong exercise, and thus at one and the same time engendering the morbid matter, and that peculiarly enfeebled condition of the fibrous structures which causes the particles of urate of soda to become mechanically arrested between the dense fibrillæ of which they are composed. It must not be inferred from the preceding remarks that cold and moisture are alone capa-

ble of producing rheumatism. Rheumatism has been attributed by different authors to a dozen different causes—gonorrhœa, leucorrhœa, disordered uterine functions, mal-assimilated food, checked cutaneous actions, &c. The causes are legion; but the effects, though differing in degree, are sufficiently uniform to remove any doubt which might exist as to the morbid matter being identical in all.

The degree of severity, both as regards the local and constitutional symptoms, depends not on varieties of the morbid matter, but on the quantity generated, and the condition of the blood on which it has to act; but it is not a little singular that all the causes to which the disease has been attributed act either as depressants on the nervous energy, and thus engender that enfeebled condition of the system in which the fibrous structures, from their low organization, would be the first to participate; or, by putting a check to the due elimination of carbon from some of the great decarbonizing emunctories, they lead to the formation of uric acid in large quantities, the effect of which has presently to be considered. A very strong corroboration of the assumption that retention and excess of urea and uric acid in the circulation either is or leads to the formation of the mor-

bific matter of rheumatism may be found in a very valuable statistical paper by Dr. John Taylor, of University College, "On some of the Causes of Pericarditis, especially Acute Rheumatism and Bright's Disease." An abridgment of this paper will be found in "Braithwaite's Retrospects," vol. xxiii., from which it appears that out of 35 cases of death from acute and severe pericarditis, 19 occurred in the progress of acute rheumatism; 10 in connexion with Bright's disease of the kidney; the others may have had Bright's disease, but if not, the cause is unknown.

Now, what is Bright's disease but a disorganized condition of the kidneys, in which albumen—one of the most important constituents of the blood as regards reparation of the animal fabric—is abnormally thrown out of the system by the urine; and urea, which is a powerful animal sedative, and which ought to be removed from the circulation by the urine, is retained. The fact that one-third of the recorded cases of fatal pericarditis occurred in Bright's disease, naturally suggests the question—If retained urea and urates will give rise to pericarditis so frequently in a disease in which the albumen is so largely eliminated from the system, and the blood, as a natural consequence, so impoverished

by its removal, need we wonder that the retention of a smaller quantity of the urates in the young and healthy subject, in whom the blood is rich in fibrin and red particles, should engender pericarditis and other rheumatic affections, accompanied by symptoms of a more highly inflammatory character. To recur to Braithwaite's abridgment of Dr. Taylor's paper. "The author next inquires into the comparative efficacy of acute rheumatism and of Bright's disease in producing pericarditis and other internal inflammations. In comparing these two affections, we meet with some difficulty, arising from the fact that one of them is an acute disease, and is seldom fatal, whereas the other is a chronic disease, and generally fatal. It appears to the author that the best way of avoiding this difficulty is, by comparing fatal cases of Bright's disease with ordinary cases of acute rheumatism. Of seventy-five cases of acute rheumatism, eight were complicated with acute pericarditis, or one in nine and a-half. Of fifty fatal cases of Bright's disease, five were complicated with pericarditis acuta, or one in ten. Hence Bright's disease, in the advanced stage, and acute rheumatism, appear to have caused acute pericarditis in an equal proportion of cases." These statistics are particularly valuable as recorded practical re-

sults furnished by one of the most able pathologists of the age, and not made with the view of bolstering up any preconceived theories as to whether the lactates or urates constitute the morbid matter of rheumatism.

## CHAPTER III.

The pathology of rheumatism considered so as to account for each symptom of the malady—The phenomena of metastasis, &c.

HAVING premised the few observations that I have to make on the pathology of rheumatism by assuming that a pre-existing condition of the system is essential to the development of the disease on the application of the ordinary exciting cause, and that that pre-existing condition consists in the formation and retention within the circulation of a larger quantity of uric acid than usual, the product either of imperfect disintegration of tissue, or of mal-assimilated nitrogenous food, we may now endeavour to unravel the network of mystery in which this disease is involved; but in doing so, I shall avoid entering into a minute description of the various symptoms, and the order in which they occur in this hydra-headed affection; for, whether it be the acute fibrous rheumatism, or the sub-acute synovial, often spoken of as rheumatic gout; or whether it be chronic rheumatism, the cause, nature, and course of the disease is the same:

their differences in form and degree depending partly on the extent to which the patient has been exposed to the exciting cause, but principally on the peculiar condition of the vital fluid at the time the morbid matter is generated. Moreover, the mere symptoms of the disease, and the order in which they occur, so as to enable the practitioner to recognise them, have been so often and so well described, that it would not only be a work of supererogation to again go over the beaten track, but it would extend this paper much beyond the limits I have assigned it without any corresponding advantage. We know that this disease in its acute form usually occurs in the young, and very often previously healthy subject, at all ages, from four or five up to fifty years,—we know that it is considered to be the peculiar appanage of the poor.

We will now take an imaginary case of fibrous or acute rheumatism, from the beginning to the end, and endeavour to show how each symptom arises. Now, for this purpose, we will take the case of an agricultural labourer, for it is among this class of persons that we find the blood in the greatest condition of purity, arising from the fact that his food is not more than is requisite for the wants of the system,—in other

words, supply and waste are nearly balanced, and the accumulation of excrementitious nitro-carbonaceous elements in the blood is prevented by the thorough ventilation to which the vital fluid is exposed, both in the systemic and pulmonary capillaries, in the daily exercise of his calling in a pure atmosphere. We will suppose such a person, by a severe day's work in the harvest season, to have engendered, by the rapid disintegration of tissue, a larger amount of uric acid and urea than ordinary; and, while the circulation is thus excited by exercise, and loaded with the partially metamorphosed products of oxidation, and while the nervous system is exhausted by the exertions which have been made, he throws himself on the damp ground, and sleeps. Now the effect of cold and moisture arising from the damp ground, in the production of this disease, is twofold. In the first place, it suddenly checks the process of oxidation, which is going on with great intensity in the systemic circulation; one portion of the partially oxidized albuminous tissue, owing to the sudden check that is given to the capillary circulation, only goes through the process of oxidation in an imperfect manner, and is thrown into the current of the circulation to be filtered off by the kidney; as uric acid instead of urea;

while the sudden check to the elimination of carbon from the skin causes another portion of the retained carbonaceous elements to reconvert the nascent urea into uric acid.

The second effect of cold and moisture in inducing the disease is demonstrated in the influence it exercises on the fibrous tissues. These structures at all times possess a low degree of organization; but now, while the nervous exhaustion that succeeds severe and protracted exertion is still further increased by the sedative effect which cold produces on the nervous system, while the body is undergoing the process of cooling, a combination of depressing circumstances takes place, under which the circulation through the fibrous tissues becomes most materially enfeebled, and that depressed condition of these tissues is thus brought on which render them liable to become the habitat of the morbid matter. To proceed with the case—when uric acid is thus engendered in large quantities from the long-continued exposure to cold and moisture, a train of morbid phenomena is immediately set up.

The uric acid, on account of its extreme insolubility,—requiring 10,000 times its weight of water to dissolve it,—is unable *per se* to escape from the circulation through the kidneys; it

unites with the tribasic phosphate of soda, on which the alkalinity of the blood depends, and forms urate of soda; and the phosphoric acid previously in combination with this soda unites with a portion of the undecomposed phosphate, and forms a superphosphate. Instead, therefore, of the alkaline phosphate, we have in its place in the blood acid urates and superphosphates; hence the highly acid condition of all the secretions in rheumatism. The urate of soda thus formed by the combination of uric acid with the soda of the blood is an extremely insoluble salt and a very powerful animal irritant, and its retention in the circulation, by stimulating the lining membrane of the heart, causes that organ to contract with greater frequency and energy; hence the full, frequent, and bounding pulse so characteristic of this disease, owing to the increased action of the heart, stimulated as it is by the presence of an abnormal irritant matter in the blood. Under these full and forcible contractions the blood is propelled with great force to the surface, and the skin's action, which had at first been checked by the sedative effect of cold and moisture, is not only restored, but soon becomes excessive, for the skin is a very highly organized structure, and largely supplied with both nervous and vascular influence, and the

patient becomes bathed in that profuse acid perspiration which is peculiar to this disease, and which enables us to wind our patient, and decide on the nature of his malady almost before we see him. It has been the fashion to say that this perspiration affords no relief, a statement with which I cannot agree.

The acute fibrous form of the disease never exists without it. There can be no doubt that a very considerable quantity of morbid matter is thrown out of the system by this great emunctory, and immense relief given to the overloaded and oppressed condition of the vascular system. In the subacute form of the disease, where perspiration is not well developed, great relief is always given by its induction, and we may imagine that, in the more acute form of the disease, the condition of the patient, bad as it is with it, would be unendurable without it. But what, in the mean time, is the condition of the fibrous structures, in which we are more particularly interested, from their being the especial seats of this disease? Unlike the skin, they possess a very low organization; they are very feebly supplied with both vascular and nervous influence, and when the reaction is set up from the presence of a foreign and irritant matter in the blood, these feebly organized struc-

tures are not prepared to participate in it; the circulation in them has not yet recovered from the depressing and astringent effect of the cold, and the particles of the urate of soda become mechanically arrested between the fibrillæ of which these dense structures are composed: hence the sense of tension and fulness which characterizes the first stage of this disease.

The tendency to aggregation, or the affinity which each particle of this salt has for others of the like nature, is very remarkable, and is fully exemplified in calculi, and in the formation of chalk-stones; each particle that is arrested in its course through the fibrous structures becomes a nucleus for others, and the pain goes on increasing as the morbid matter increases, from the mere sense of tension and fulness which characterizes the first stage of the disease up to that acute, lacerating, tearing pain which occurs as the disease advances, and which is so painful to the patient to bear, and so distressing to the medical attendant to witness. I may here observe that the pain of rheumatism in the acute fibrous form of the disease is dependent on the particles of urate of soda which accumulate in the myolemma and sarcolemma of the muscles pressing on the nervous fibrillæ which traverse these structures, and temporarily paralysing them by

the pressure occasioned by their accumulation. The patient, though restless, is unable to move, and tells us he is paralysed, which is literally the case for a time; with the removal of the morbid matter the motor power in some degree returns, but there is frequently a want of power for some time after a severe attack.

After a time, which may vary from hours to days, the circulation in the part becomes restored; partly owing to the reaction which takes place in the part itself, and partly owing to the *vis a tergo*, the morbid matter is again thrown into the current of the circulation, and again takes up its habitat in that particular fibrous structure which has been in the next degree exposed to the depressing influence of the exciting cause; hence the phenomena of metastasis, and as a general rule we may predict, although it is somewhat hazardous to predict anything in this eccentric disease, that in proportion as any particular fibrous structure has been exposed in a greater degree than others to the depressing influence of cold and moisture, so much the more will its vitality be impaired, so much the more will the affinity of the morbid matter for that particular joint or structure be increased, and so much the less will be the tendency to metastasis from this to any other joint or struc-

ture. The old saying, that "the weakest goes to the wall," is most fully illustrated in this disease, as well as in gout, as the lithates of soda, whether in gout or rheumatism, are always deposited in those parts where the circulation is most enfeebled and the vitality low, whether that impaired vitality is attributable to the depressing influence of cold and moisture, or to the affected organ having been the seat of recent disease or injury.

It may be objected to this view of the pathology of rheumatism—how is it that if the fibrous structures are not inflamed, that we have all this swelling as well as pain?—this effusion must surely be the product of inflammation. Whence this highly inflammatory condition of the blood, as evinced by its buffed and cupped appearance? to which it may be replied, that this highly vitalized condition of the blood, which we mis-call inflammatory, arises, not from any influence that the fibrous structures exercise on that fluid, but from the fact that the blood, loaded with a powerful animal irritant poison, stimulates the heart to contract with increased frequency, fulness, and energy, and the process of oxidation is carried on in the pulmonic capillaries in the very highest degree of perfection, by which means every particle of the albumen of the chyle

becomes converted into fibrin, and engenders that highly vitalized condition of the blood which we recognise in its buffed and cupped appearance, and which we have hitherto supposed to be indicative of the inflamed condition of the fibrous structures, which we bleed to subdue, because we think it indicative of inflammation, but which by bleeding we increase. With regard to the effusion, we must remember that although the fibrous structures possess a very low degree of vitality, and are very reluctant to take on inflammatory action, even when loaded with a powerful animal irritant, like the urate of soda, still they are in immediate contact with structures, such as serous and synovial membranes, that are much more prone to take on inflammatory action; and when we find the products of inflammation in the shape of effused serum, lymph, or pus, it is always within the shut sacs formed by these membranes, and the reason I conceive to be this: the irritation set up in the fibrous structures from the presence of urate of soda extends to these structures in immediate contiguity with them, and although the irritation which extends to them might not, so long as the blood continued in its ordinary state, give rise to inflammation, still such is not the case in rheu-

matism, for the blood is, from the reasons above stated, in a state of super-fibrination, and consequently we get inflammation in the serous and synovial membranes partly from contiguous irritation and partly from the highly vitalized condition of the blood. As regards endocarditis, I believe it to be almost entirely attributable to this super-fibrination of the blood, brought about by the urate of soda, rendering blood previously rich in fibrin and red particles, and in a perfect state of vital purity, so stimulating, not merely from the urates, but also from excess of fibrin, the result of excessive oxidation, that it irritates the serous covering of the valves, and thus renders them more prone to arrest the fibrin from this overcharged solution; and it is with no little gratification that I find that this opinion is participated in by Mr. John Simon, for although I do not concur with Mr. Simon "in regarding fibrin not as the nutritive material of the blood, but with Zimmerman and other physiologists, as the result of the waste of the tissues or the decay of the blood itself," still I do agree *in toto* with the reply he gives to the question, "How do these valve diseases originate?" "I believe that the origin of the vegetations is directly humoral; that

they arise as fibrinous precipitations from an overcharged solution, the valves encrusting themselves with fibrin just as a stick in certain streams coats itself with a calcareous envelope, and that the preference shown for the left side of the heart admits of explanation by reference to the peculiarities of its contents—the new-made arterial blood. You will observe that this theory involves the supposition that arterial blood is more prone than venous blood to precipitate its fibrin, either as containing more of it or as containing it in some more separable form. Not wishing to leave this a matter of uncertainty, I have experimented on the subject. I have carried a single thread by means of a very fine needle transversely through the artery and vein of a dog, leaving it there so that it might cut the stream, and I have done this repeatedly, sometimes in the femoral vessels, sometimes with the carotid and jugular, sometimes with the aorta and cava. I have suffered the thread to remain during a period of from twelve to twenty-four hours.

“My experiments have given me as a uniform result, that the arterial blood with the utmost readiness deposits its fibrin on the thread; the venous blood with the utmost reluctance.

And in most of my experiments, the thread, where it traversed the coats of the artery, presented a very considerable vegetation on its surface (exactly like those we are talking of on the valves of the heart); a vegetation sometimes as large as a grain of wheat, always of a pyramidal shape, with its apex down stream and its base attached to the thread. In the artery, one might say that the thread whipped the blood, just as one whips blood in a basin to get the fibrin out of it; but with this trifling difference that, instead of the rod beating the fluid, the fluid ran over the rod and precipitated its fibrin there. In the vein the thread seemed to operate no way but obstructively, never coating itself with fibrin, but sometimes delaying or stopping the circulation with a voluminous black clot, chiefly collected on that side of the thread remotest from the heart. Accordingly, the general statement and rationale of the matter appears to be as follows:—the disease in which these deposits are so frequent is one of intense over-fibrination of the blood, and one in which almost certainly there are other conditions besides quantity making the fibrin easy of precipitation; the left side of the heart has preference because it is the arterial side, and because arterial blood, as we have seen, readily parts

with its fibrin; the valves, and particularly their streamward surfaces, are chosen for the deposit because their position exposes them chiefly to the friction of the current; so that the whole curious selection of site for the deposit resolves itself into the concurrence of two conditions, which are fulfilled in that one spot of the vascular system, namely:—the greatest chemical tendency to the deposition of fibrin, with the greatest mechanical facilities for its entanglement.”

One of the points on which practitioners are perhaps more unanimous than any other is, the much greater frequency with which cardiac complications supervene in the young than in adults. All admit that the younger the child, the more probable, *cæteris paribus*, that some cardiac complications will arise. There can be no doubt that the greater predominance of the nervous system during early life renders the heart more irritable. This fact, and the induction to be derived from it, should not be forgotten when we are called on to treat the acute form of the disease. Another remarkable circumstance in rheumatism is, the comparative immunity which the dura mater enjoys over the other fibrous tissues in its exemption from becoming the primary, or even the secondary, seat

of the morbid matter. This immunity is in all probability due to the protective influence which the calvarium exercises in protecting the dura mater from the depressing effect of cold and moisture; for we have seen that the first law of lithiasis is, that the morbid matter of both gout and rheumatism is always deposited in those fibrous tissues in which the circulation is enfeebled by cold or injury, or by some mechanical obstruction or arrestation of the particles of the urate of soda between their fibrillæ. Now the occurrence of anything like cerebral complications during an attack of rheumatism is so universally known to be pathognomonic of either endocarditis or pericarditis, that no practitioner in the present day would be guilty of the culpable neglect of not at once examining with the stethoscope to ascertain whether his patient had incipient pericarditis or endocarditis; for he is almost certain to find one. Dr. Watson, I believe, was the first who drew the attention of the profession to the insidious nature of these cerebral complications; and he relates in his excellent work the particulars of several fatal cases, and their *post-mortem* appearances. Many of these cases were formerly supposed to be instances of genuine metastasis to the brain; but the *post-mortem* examinations almost invariably

revealed cardiac complications, and in most cases no appearance of cerebral inflammation, and in others only slight effusions, so slight as to make it doubtful whether they were morbid results. The question, therefore, which naturally suggests itself is, in what way is the cerebral excitement connected with the rheumatic affection of the heart? It cannot be due to the rapidity and energy of the circulation through the brain, for it often happens when the disease is on the decline and the morbid results do not generally indicate the existence of inflammation. I believe that when effusion takes place into the pericardium, or fibrin is deposited on the valves, or any other circumstance occurs which impedes the return of blood loaded with urates from the brain, and thus induces, owing to these mechanical impediments, that retarded condition of the circulation in the ultimate capillaries most favourable to the deposition of the urate of soda, a few particles of the morbid matter become arrested in the dura mater, and give rise to irritation of the arachnoid, which is in such close contiguity with it. So long as no impediment existed in the circulation, the particles of urate of soda passed freely through the vessels of the dura mater, the vitality of which had been in no degree impaired by

the depressing influence of the exciting cause, and it thus escapes the tendency to metastasis; but when an obstruction exists to the free return of blood from the upper extremities, the ultimate capillaries of the dura mater would be the first to feel that obstruction. A state of the circulation is thus engendered more favourable to the deposition of a few particles of the morbid matter; and although a sufficient quantity of the materies morbi may not be deposited in the dura mater to give rise to inflammation of the arachnoid, still we have to bear in mind the highly-organized, irritable nature of this structure, and to ask ourselves whether, although there may not be sufficient accumulation of the morbid matter to bring on inflammation of the arachnoid, and to produce the morbid results which would be indicative of its existence, is there not quite sufficient to produce irritation, and hence the delirium?

## CHAPTER IV.

Subject continued—Cause of pain—Greater liability to cardiac complications in young subjects—Subacute rheumatism, less tendency to metastasis, greater tendency to permanent malformation of joints—Chronic rheumatism.

IN the acute or fibrous form of the disease the pain usually commences in the fascia, or fibrous covering of the muscles, and gradually extends to the neighbouring joints, which become more or less implicated. The aponeurotic fascia which invests and separates the muscles from each other sends delicate prolongations in between the fasciculi of fibres of which the muscles are composed, and constitutes their myolemma, and not only serves to bind them into one aggregate mass, but it is the medium through which the delicate nerves—by means of which the muscles are made subservient to our wills—reach their destination. When the particles of urate of soda become mechanically arrested in these fibrous structures, they not only by their accumulation give rise to the peculiar pain of the disease, but by pressure on the

nervous fibrillæ which traverse them, they virtually produce paralysis; and when the patient complains not only of pain, but of his inability to move, and tells us he is paralysed, he is speaking the literal truth, for he is to all intents and purposes temporarily paralysed. The removal of the morbid matter, the restoration of the normal vitality to the part, and the cessation of loss of motor power, are simultaneous circumstances, although the part frequently remains weak and comparatively powerless for some time. With regard to heart affections, I have nothing to add to what has already been written by others respecting these alarming and serious complications, except to add my testimony to that of others, viz., that, *cæteris paribus*, the more severe and acute the disease, and the younger the patient, the greater the probability of their occurrence.

With regard to the subacute or synovial form of the disease, I have little to say respecting its pathology apart from what has already been said respecting acute rheumatism, and what I shall presently have to say respecting gout. It is dependent on the same exciting cause as acute rheumatism, and the chain of events follow in the same manner; the intensity of the symptoms depending on the extent to which the vital

purity of the blood has been impaired by those depressing causes which are productive of gout. In some cases, and generally in the more vigorous class of patients, the symptoms of rheumatism preponderate; in others, where the constitution is more decidedly cachectic, and where the patients are the offspring of gouty parents, but hardly sufficiently advanced in life for the full development of that disease, gouty symptoms are in excess; at other times both diseases appear to exist concurrently in a mitigated degree. One never sees two cases precisely alike; and when we reflect on the compound nature of the malady, this ceases to be a matter of surprise, for the severity of the affection, and its tendency to assume in a greater degree the peculiar symptoms at one time of gout, at another of rheumatism, depends partly on the quantity of morbid matter that exists in the circulation, partly on the extent and degree to which the vitality of the fibrous tissues has been impaired by the sedative effects of cold and moisture, and partly by the condition of the blood itself, on which the morbid matter exercises its peculiar influence, according to the degree in which its vital purity has been impaired by pre-existing circumstances.

Where the disease partakes more of the character of rheumatism, the symptoms are those of

the acute form of the disease, less only in degree, and the disease appears to commence and be restricted more to the fibro-cartilaginous structures of the larger joints; the knee-joint being the one most commonly and severely affected. There is less constitutional and febrile excitement; the pulse is less full, and the perspiration is less profuse; but the disease varies so much in its character, as to render it almost impossible to describe it, at one time beginning as acute rheumatism, and gradually lessening, as it were, into subacute: at other times there is a want of power from the beginning. One of the most noteworthy circumstances is, that there is not only less liability to either endocarditis or pericarditis, but there is altogether less tendency to metastasis. There does not in many cases appear to be vigour enough in the circulation to propel the morbid matter from its original seat; but while our anxiety is diminished on the score of life itself, we have much more reason to fear chronic and permanent injuries of the joints, which may cripple our patient for at least months to come. The morbid matter, when once deposited in a part, acts as an irritant; and although not stimulating the circulation sufficiently to bring about that reaction in the part itself which would lead to its propulsion into the

general circulation, it causes increased circulation in the part. The result is, that increased nutrition and hypertrophy of the adjacent structures take place, the synovial membranes become thickened, and large deposits of phosphate and carbonate of lime, mixed with the urates, become deposited on the articular surfaces of the bones. The fibro-cartilaginous structures, the original seat of the morbid deposit, exposed at last to pressure on all sides, undergo gradually a process of atrophy, and the joint becomes permanently disorganized. It is the duty of the practitioner to foresee, and if possible obviate this calamity. Chronic rheumatism is sometimes a primary affection, sometimes the sequelæ of the more acute form of the disease. When it occurs as a primary affection, it is generally in persons who have led regular and temperate lives, and in whom the vital purity of the blood has not been impaired, either by excesses or errors in diet, or by that congenital or early acquired debility of the assimilative organs which is so favourable to the development of gout. It generally occurs in persons who have passed the grand climacteric of life, and who either live in damp localities or whose occupations expose them to severe vicissitudes of temperature. At the period of life at which this affection usually

occurs, the blood is less stimulating in its properties, it contains less fibrin and fewer red particles, and the morbid matter which is generated by checked cutaneous action consequently gives rise to much less severe constitutional excitement; on the other hand, the depressing influence of cold on the feebly-organized fibro-cartilaginous structures, if less severely felt, is more enduring and permanent; not only does metastasis take place less frequently, but the disease itself is measured by months and years instead of, as in the more acute form, by days and weeks. The disease assumes, in some forms, the fibrous type, as we see in lumbago; but this is of the least frequent occurrence. In other cases, the synovial and cartilaginous structures of the joints are attacked, and very frequently become enlarged and form those nodosities which have been so well described by Dr. Haygarth, and which from their symmetrical tendency, affecting similar joints on opposite sides of the body in a precisely similar manner, was first pointed out by Dr. Budd as strongly corroborative of the assumption that rheumatism was a blood disease.

The pain of chronic rheumatism is generally felt most towards night, and is frequently aggravated by the warmth of the bed. When this

is the case the disease partakes in some degree of the subacute type. Where the increase of pain takes place nocturnally, and is not occasioned by the increased warmth of the bed at that time, it is because all sources of irritation occasion greater pain in the state of nervous exhaustion which occurs towards night. When chronic rheumatism has existed for any length of time, the joints not only are enlarged from morbid deposits, but the appearance of enlargement is often greater than it really is, on account of the atrophy of the muscles. Patients find out the degree of flexion or extension of a joint under which the synovial surfaces are brought less firmly into apposition, and consequently under which the greatest amount of relief from pain is experienced, and they will maintain that position for months; the muscles waste, and the limb, partly owing to the enlarged state of the joint and partly owing to the atrophy of muscular substance, and the semiflexed position the patient has so long maintained, very frequently presents an appearance of permanent and irremediable deformity, when such is by no means the case. Sometimes almost every limb in the body is affected; at other times only the hands and wrists, and such joints as are the most exposed. In some cases the patients suffer for

only a few weeks or months; in others the disease is scarcely ever absent; but even in the worst cases there is generally a mitigation of the symptoms during the summer months; in the milder ones frequently a total suspension, till the damp and cold of autumn again engender the morbid matter, and that state of the fibrous tissues most favourable to its retention and accumulation in them.

## CHAPTER V.

Discrepancy of opinions as to the best mode of treating rheumatism accounted for—First object to diminish vascular excitement—Second, to diminish pain and neutralise morbid matter, and prevent metastasis—Third, to promote convalescence—Bleeding, purgatives, combined with opiates, on the late Dr. Chambers's plan — Lemon juice, colchicum, opium, nitrate of potass, vegetable salt of potass, decoct. cinchonæ—Warm clothing—General summary of treatment: leeches, fomentations, &c.—Dry warmth—Counter-irritants—Diet—Attention to secretions during convalescence—Hot-air bath—Cold.

To enter into a discussion on the relative merits of the various plans of treatment which have been adopted at different times, by the various authors who have devoted attention to this malady, would be an endless undertaking. The compound nature of the disease, and the tendency which exists to a favourable termination where no cardiac complications occur, and the fact that some remedies are towards the latter stages of this affection beneficial, which at the commencement of the malady would be useless, if not injurious, may account in some degree for the discrepancy of opinions which has existed as to the most rational mode of treatment; but as

in my humble judgment the true nature of rheumatism has not hitherto been understood, it must cease to be a matter of surprise that its treatment has been empirical and uncertain. This want of unanimity as to the true nature of the malady has led to the employment of a whole host of remedies; to enumerate all, or enter on their relative merits, would be to go through the Pharmacopœia. I shall therefore only notice a few of the principal ones which have been used in modern practice, and in doing so consider their applicability to the objects to be attained. We have to bear in mind that the indications to be fulfilled are, first, to reduce that extreme irritability of the heart which causes the process of oxidation to be carried on with such force in both the systemic and pulmonic capillaries. There are two reasons for this; the first is, that this rapid and vigorous pulmonic circulation causes the albuminous elements of the blood to be so speedily raised into fibrin that a state of super-fibrination of the blood ensues, and increases the danger, not only of a portion of it being deposited on the valves and giving rise to endocarditis, but this super-fibrinated state of the blood causes inflammatory action to be set up more rapidly in those serous and synovial structures which are contiguous to the fibrous

tissues in which the morbid matter is temporarily located than it otherwise would be. Moreover, under this highly-excited and rapid vascular action, metastasis is much more frequent. We leave our patient with chronic rheumatism in his knee without any anxiety as regards his life, we know that we shall on our next visit find the disease where we left it; but we revisit our patient with acute rheumatism with fear and trembling; we apply our ear to the stethoscope on each visit, from the fear that our insidious enemy may steal a march upon us. In the great majority of cases we find all going on well, but we never, especially in young subjects, can feel confident enough to neglect a stethoscopic examination without perhaps having to reproach ourselves with neglecting the timely warning which we might have received through its assistance. Secondly, it is desirable to diminish the action of the heart, and the irritability occasioned by the morbid matter; because, under the rapid and energetic systemic circulation which takes place, the destructive assimilation of Prout, or the metamorphosis of tissue of Liebig, is carried on with greater rapidity than perfection, and the *débris* of partially-oxidized albuminous elements are carried into the current of the circulation before the process is finally completed, and

makes its appearance as uric acid instead of urea: the morbid matter is thus constantly being generated *de novo*. The first indication is, therefore, for the reasons assigned, to administer such remedies as shall alleviate the pain and diminish that irritability of the heart which leads to super-fibrination of the blood, and the constant renewal of the morbid matter. The second indication is, to combine with remedies given for this purpose such medicines as shall neutralize and render more soluble that morbid matter which is the *fons et origo mali*. The next object is the treatment, in the application of such local and topical remedies as shall alleviate pain and diminish the tendency to metastasis. The fourth and last object is to promote a safe and speedy convalescence.

Of all the remedial measures which have at various times been used in the treatment of rheumatism, venesection perhaps, is the first which has a claim on our consideration, from the great frequency with which it has been practised, and the great extent to which it has been carried, and I firmly believe the great injury which it has done. The extent to which venesection has been carried in the treatment of rheumatism was in all probability due to the opinion that so long prevailed, and which many men still maintain,

that rheumatism is dependent on inflammation of the fibrous tissues, and that there was in inflammation of these tissues great tolerance of blood-letting. Now the late Dr. Marshall Hall, in his valuable treatise on blood-letting, says that, "where there is great tolerance of blood, it is remedial and safe; in all cases in which there is intolerance, it is proportionately of doubtful efficacy, and replete with danger." We have few principles in medicine that are so definite that we can call them rules, but this is one, and a golden one it is, for it has by its observance relieved the doubts, and confirmed or modified, as the circumstances of the case demanded, the opinions and the practice of many a young, ay, and even well-informed practitioner; but, like every other rule, it has its exception, and in this instance, the fact of its being remedial and safe, because there is great tolerance, is far from being the case. The highly buffed and cupped condition of the blood in this affection—a condition which is not diminished but increased by each bleeding,—has tended to keep alive the delusion that rheumatism was dependent on, or at all events complicated with, inflammation of the fibrous tissues. We have already seen that the blood is thus highly buffed and cupped because it is rendered so highly stimulating from its being

loaded with morbid matter, which excites the heart to those full and forcible contractions under which the process of oxidation is carried on in both the pulmonic and systemic capillaries with the greatest intensity, and thus leads to the constant fresh formation both of fibrin and the morbid matter of the disease. Now, bleeding does not diminish the quantity of the morbid matter, for, if we take away forty ounces of blood, there is relatively as much of the materies morbi left in the circulation as there was before we took the first drop; but bleeding does increase the irritability of the heart, a condition we are most desirous of diminishing. Dr. Macleod, in this country, and Bouillard, in France, have been the great advocates for large bleeding, but their statistical returns are, even upon their own showing, anything but favourable; and judging from these, I should say that their assertions—that they have by large bleedings cut short the disease—were true, but it must have been by cutting the thread of life.

As regards smaller bleedings, I do not think that, as a rule, they are desirable or beneficial; in some cases, perhaps, where there is that extreme tension of the vascular system in young and plethoric subjects which is so inimical to absorption, we may take a small quantity of blood for

the purpose of accelerating the absorption of other remedies, but, as we generally give purgatives in the commencement of an attack with this view, bleeding is unnecessary; indeed purgatives, if carried too far, are liable to the same objection as bleeding, and when it becomes necessary to repeat them, they should be guarded with opiates.

Complications may and frequently do occur during acute rheumatism, either from metastasis or extensions of inflammatory actions—as in pericarditis or pleurisy—which may render the free abstraction of blood a necessity; but whenever such complications do occur, the sedative effect of the bleeding must be maintained by the administration of a very full dose of opium, and by repeating it at intervals if necessary. The quantity of opium that is administered in some of these cases, without the slightest appearance of narcotism, is almost incredible. Although purgatives, when given in too large doses, are liable to the same objection as bleeding, still, when given in the commencement of an attack, they are beneficial, especially when their sedative action is maintained by combining them with, or subsequently administering, opiates to prevent reaction. This plan of treatment was introduced by the late Dr. Chambers. He

was in the habit of giving large doses of calomel—eight or ten grains at bed-time, with one or one and a half grains of opium; this was followed by a strong black draught, sufficient to ensure four or five stools; with this treatment was combined saline draughts, with vinum colchici and Dover's powder.

Dr. Hope speaks highly of this plan of treatment, and says that the swelling of the joints was generally reduced in two days, but almost always in four. When this took place the calomel was omitted, or sooner if the gums were tender; but the opium was continued in doses of a grain or a grain and a half at bed-time, and in severe cases a grain at noon was added. The colchicum and black dose were continued, and the cases were generally well in a week. I have a strong suspicion that these were not instances of pure rheumatic fever, but were that hybrid type of the malady which we call rheumatic gout; and here this plan of treatment is remarkably efficacious, for it is always more or less accompanied by congestion of the liver and portal circulation. Hardish purging is required, and calomel and colchicum, from the peculiar influence they exercise in rousing the torpid and overloaded vessels of the liver to increased activity, are productive of much good. It is unde-

sirable, however, to carry mercurial treatment to the extent of incipient salivation; the necessities of the case do not demand it, and the patient has miseries enough to go through without this addition to them.

In the great majority of cases this hard purging is not only unnecessary, but I believe that it would frequently have done mischief if its depressing influence had not been counteracted by the opiates which were combined with the calomel and colchicum. I have seen cases which not only would have got well without this continued hard purging and these large doses of calomel, but which there was every reason to believe got through in spite of them, and through the sedative effect of the opium with which they were combined; still, in a modified form at the commencement, and repeated at intervals, especially if combined with or followed by opiates, purgatives are beneficial.

Lemon-juice was first introduced by, I believe, Dr. O. Rees. As far as my own experience goes, I must confess I have occasionally found very marked and decided benefit from its use; at other times it not only appears inert, but gripes and purges, and has to be at once abandoned. Where it succeeds, I believe its success is attributable to the vegetable salts of potass that it

contains, citrates, malates, tartrates, &c., in a high state of dilution. We are in the habit, when we prescribe these salts, of giving them in too concentrated a form. Hence they often fail to be absorbed, and act as purgatives, instead of as renal depurants and alkalies. Colchicum, in the acute form of this disease, I believe to be very much over-estimated, but its administration is sanctioned by experience and demanded by custom, and not to prescribe it would, in the eyes of many, be almost a criminal neglect; but although of little value in the treatment of pure rheumatism, it is—in proportion as the disease assumes that hybrid type which we recognise as rheumatic gout, and which is always complicated with hepatic and portal congestion—invaluable; but as we shall presently have to enter more fully into its *modus operandi* when we discuss the treatment of gout, we may pass on to opium, the use of which was first advocated by Dr. Corrigan, of Dublin. It would be difficult to exaggerate the advantages which this valuable drug affords the practitioner in the treatment of this disease, and the comfort it gives the patient, harassed as he is by pain, and worn out by want of rest. But it is not merely as a palliative, by relieving pain and inducing sleep, that opium is so invaluable, but it is because, by its

sedative influence, it diminishes that energetic action of the heart which is occasioned by the presence of the irritating morbid matter in the blood, and under which that intense oxidation goes on which leads to super-fibrination of the blood and the constant accumulation in the circulation of partially decarbonized albuminous elements.

Opium, by diminishing the irritability of the heart, causes fibrination of the blood to go on less rapidly; and, by checking the rapidity with which destructive assimilation takes place, it causes it to be more effectually performed, and the effete albuminous tissues to be resolved into urea instead of uric acid.

In the treatment of acute rheumatism, our object is to check the rapidity with which oxidation is going on; in gout, on the other hand, our whole treatment is directed to its more rapid fulfilment. Between acute rheumatism and gout there are many types, and our successful treatment of such cases will depend on our directing our measures either to the promotion or diminution of oxidation, according to the predominance of either the rheumatic or gouty condition of the blood. Opium is the curb by which we check the pace at which oxidation of tissue goes on, colchicum the spur by which we promote it.

We may combine opium with purgatives, according to Dr. Chambers's plan, which is the best in the beginning, and we may then continue it every four hours in combination with our other remedies. The dose cannot be regulated by any arbitrary rules; very much larger doses than are given under ordinary circumstances are necessary, and may be given without producing any tendency to narcotism. Nitrate of potass, when taken into the circulation, unquestionably exercises a very powerful influence in repressing that excessive fibrination which is so remarkable in this disease, and which renders it so prone to light up inflammatory action in the serous and other highly-organized tissues in immediate contact with those fibrous structures in which the *materies morbi* is deposited. But although potassæ nitras is a very valuable adjuvant in the treatment of acute rheumatism, we must not trust to it alone. We are called on to do something more than save the lives of our patients, which it might possibly do by itself through its power in diminishing the risk of endocarditis, but it neither allays pain, nor neutralizes or expels the morbid matter from the circulation with the same certainty that other and equally available remedies do. The next, and, in my humble judgment, the most valuable class of re-

medies, are the vegetable salts of potass. These salts, when given in a high state of dilution, become rapidly taken into the circulation, where they absorb oxygen and become converted into carbonates; and as uric acid is readily soluble in a dilute solution of carbonate of potass, the value of these renal depurants becomes at once apparent. The acetate is the best form in which to administer this remedy in rheumatism, both because it has a greater affinity for oxygen and is more agreeable in its taste. It requires to be given in a high state of dilution, about twenty-five grains every four hours; opiates should be combined with it, either the tinct. opii, or the pil. saponis cum opio, may be taken at intervals. Ten or fifteen grains of potassæ nitræ may be advantageously combined with the acetate in acute cases; and in the subacute, where there is less tendency to endocarditis and more hepatic and portal congestion, both the opiates and the potassæ nitræ may be omitted, and colchicum given in their stead. When the acetate of potass is administered, the character of the urine becomes speedily altered; instead of being scanty and high-coloured, and intensely acid and loaded with lithates, it becomes more abundant, much paler, and slightly alkaline; simultaneously the local and constitutional symptoms diminish, the

tongue becomes cleaner, the pulse less full and frequent, the pain first diminishes, then disappears, and the swelling and enlargement of the joints subside with comparative rapidity, when we consider the intensity of the local excitement which has recently existed. We may now give some mild tonic: the decoct. cinchonæ is perhaps the best, with small doses of the acetate of potass to neutralize and prevent the accumulation of fresh morbid matter, and the action of the surface must be promoted by wearing flannel and fleecy hosiery, or such clothing as will prevent the too rapid evolution of the animal heat, for those fibrous structures which have been the seat of recent rheumatic deposits are still weak, and in the highest degree sensitive to the depressing influence of cold and moisture. Some persons advocate the administration of quinine *ab initio*; but I must confess myself at a loss to know on what principle. Theoretically, I not only see no reason for its administration, but many against it; practically tried, it will be found to aggravate all the symptoms to a degree that would convince any reasonable person that it was altogether contra-indicated. Taking a retrospect of the compound nature of the malady, of the great value which the different remedies

used, possess in modifying and subduing particular symptoms of the disease, and their comparative inertness in controlling other symptoms, and recollecting that it is not one, but the aggregation of symptoms which constitute the disease, I can readily understand, how one practitioner has placed his faith in opium, from the great benefit which he has derived from its subduing the high constitutional excitement; while another triumphantly asserts that he gives potassæ nitras alone, and that he has never lost a patient by endocarditis; and another, who gives acetate of potass alone, asserts that his patients are cured with greater rapidity than by any other means, through its depurative power in purifying the blood from the *materies morbi* on which the disease depends. It becomes us, however, who profess to regulate our practice on scientific and rational principles, to discard these narrow-minded and empirical prejudices; to reflect on the compound nature of the malady; to discriminate before prescribing, whether the case is one of purely acute rheumatism, demanding opiates to check the excitement of the vascular system, potassæ nitras to diminish the tendency to fibrination, and acetate of potass to act as a solvent of the morbid matter; or whether it is one of those cases in which the symptoms are more

localized and articular, the constitutional symptoms less severe, in which that gouty condition of the blood exists, which is complicated with hepatic and portal congestion, and which, while they contra-indicate the necessity of opiates and potassæ nitras, demand the administration of colchicum purgatives, and such remedies as shall promote a more rapid oxidation of tissue, and a more free cutaneous exudation.

It is only by regulating our practice on these principles, both as regards our diagnosis of the disease and the applicability of our remedies, that we can hope to attain that success which rational will always maintain over empirical practice. In the acute form of the disease there is much greater tendency to metastasis than in the sub-acute and chronic, except perhaps in those cases in which some one joint or limb has been exposed in a greater degree, and for a greater length of time, to the depressing influence of cold than others, and the disease will then obstinately linger in that joint. The application of leeches will generally relieve the inflammation of the synovial membrane that is set up from contiguous irritation; and they are beneficial not only in this respect, but, by diminishing the vitality of the part, they lessen the chance of metastasis from reaction, under

which the morbid matter is thrown into the circulation, to again take up its quarters we know not where. It is better therefore to leech at once, with the view not only of relieving the pain, but of diminishing the tendency to cardiac complications, and we should endeavour to keep down local inflammation after the application of the leeches by means of warm anodyne fomentations: that recommended by Dr. Fuller is as good as any that I am acquainted with, and consists of decoct. papaveris, potassæ bicarb. and tinct. opii. The part affected may be either assiduously fomented with this hot decoction, or the joint may be enveloped in a linen rag soaked in it, and covered with spongio piline or oiled silk: it certainly relieves the pain, and by diminishing the local excitement lessens the tendency to reaction, and consequently metastasis; but, independent of the direct good it does, it serves to amuse and satisfy the patient, who looks on his malady as a local one, and expects something to be *done* for it, and he does not think that merely taking medicine is doing anything. When we find the urine becoming alkaline, and the tongue cleaning, we may substitute dry warmth for the lotion, hot salt in flannel bags, or chamomile flowers heated before the fire. Until the system is in some degree brought under the

influence of opiate and alkaline remedies, it is desirable not to use dry warmth, as it will only be found to increase the pain and the tendency to metastasis; and it is much better to bear with the disease in the ankle, knee, or wrist, than to force the morbid matter we know not where, by using hot and dry applications before the influence of the alkali on the blood has shown itself in the urine.

In those cases in which the vascular excitement does not run so high, in which the fulness and frequency of the pulse is less, and there is less tendency to the profuse acid perspirations, in fact, where the disease assumes in some degree the type which we recognise as rheumatic gout, we may with advantage omit the potassæ nitras and the opium after the first few days, as there is not only no necessity for either, but their continued use is rather contra-indicated than not; but between the acute form of the malady and rheumatic gout many modifications of the disease both in form and severity are met with. It is needless to say that the remedial measures must be adjusted and modified to meet the altered circumstances by the discretion and judgment of the practitioner, as it is impossible to prescribe for imaginary cases. One thing, however, it is essential to bear in mind, that as

a rule it will be found that, in proportion as the case deviates from the acute fibrous form, and the necessity for potassæ nitræ and opium diminishes, the necessity for the administration of colchicum and diaphoretics increases. In fact, according to my own experience—an experience which I find corroborated by the observation of others, colchicum is as beneficial when judiciously administered in this form of the disease as it is useless in the acute; its efficacy is in all probability due to the chologogue influence which it exercises over the congested state of the hepatic and portal circulation which forms so prominent and important a feature in the disease. Our treatment of this form of rheumatism is based to a great extent on this view of the matter. Renal depurants are of no use, until the obstructed state of not only the liver but the chylopoietic viscera in general, is removed; for this purpose we administer calomel, colchicum, taraxacum, &c. in pills, followed by Scudamore's mixture, to which may be added tinct. hyoscyami, or a small dose of one of the salts of morphia to relieve the pain. After the circulation in the liver has been restored to a healthy condition, a combination of potassæ acetæ, vinum colchici, and vinum ipecac. will in a very few days restore the blood to that healthy con-

dition under which rheumatism cannot exist. As soon as the severity of the attack is mitigated, blisters should be applied to the affected part; but it is better not to carry them to the extent of vesication; the parts are weakened by the excessive action which has taken place in them, and require rest and such an adjustment of the joints in splints, or other mechanical contrivances, as shall ensure the least amount of pressure on the still tender and inflamed synovial surfaces. Repeated blisters applied only for two or three hours, so as to act as rubefacients only, or sinapisms applied for a few minutes, relieve the inflamed condition of the synovial membranes, and at the same time act as stimulants on the less sensitive fibrous structures, and arouse them to new and healthy action, under which they are enabled to throw off the residue of the morbid matter with which they are still loaded. Convalescence is, however, frequently very protracted, in spite of all local treatment. In such cases it will generally be found that the colchicum and alkalies have been too soon abandoned. Tonics are beneficial as soon as the tongue is clean, and none perhaps more so than bark; but tonics alone, given before the stomach and chylipoietic viscera have recovered from the over-stimula-

tion which almost invariably accompanies rheumatic gout, and before the blood is thoroughly purified from the morbid matter, stimulate the appetite, lead to overloading of the digestive organs, produce congestion of the liver and the formation of fresh morbid matter, which again takes up its habitat in the structures originally affected; because in them the vitality and consequent power of propelling the morbid matter is diminished. The patient and his medical adviser are both of them annoyed and perplexed, and both blame the weather instead of themselves. To prevent this, small doses of blue pill and colchicum, or larger doses of taraxacum, with a small quantity of the acetous extract of colchicum, should be prescribed at bedtime, and the digestive power must be maintained and the blood purified by combining small doses of acetate or citrate of potass with the bitter infusion which we may think most appropriate for the case; but all these precautions are of no avail unless the strictest attention is paid to diet. Patients are naturally anxious to recover their strength and emancipate themselves from the restraint of medical surveillance, and for this purpose they frequently establish an *entente cordiale* with their cook, who they think can now do more for them than their doctor.

This alliance is but of short duration, as symptoms of congested liver, &c., soon re-appear. We must remember, and the patient must be told, for he does not know, that the disease was not caused by cold alone, but that it does, in a great degree, owe its peculiarities to an impure condition of the blood resulting from repletion. We must remember, and we must endeavour to make him understand, that he is necessarily leading a life of inactivity, of physical, if not of mental torpor, that the waste of the system is, under such a life, but small, and if the supply of food exceeds the demand occasioned by waste of tissue, he is at one and the same time reproducing that congested state of his liver, and that impure condition of his blood, which is not only inimical to convalescence, but which is most favourable to a relapse. The diet should at first consist of fish and vegetables, with meat on alternate days only; and the patient should always cease eating before the appetite is satiated. As soon as he is able to take exercise, the diet may be increased in quantity and quality, but it will be necessary to watch the alvine secretions for some time, and if the evacuations lose their bilious character, and the tongue becomes loaded, the urine more highly-coloured and of a greater specific gravity, we must take precautionary

measures at once. The importance of attention to the functions of the skin cannot be exaggerated. From the necessarily sedentary habits of persons recovering from rheumatic gout, the elimination of carbonaceous elements from both the skin and lungs is below the normal quantity. The most agreeable and efficient way of assisting the action of the skin in its depurating functions is, by means of the dry-air bath, or the vapour bath, taken every night before getting into a warm bed; but as soon as the patient is sufficiently recovered, and strong enough to bear it, sponging the body all over with cold water on first rising in the morning, and following it with vigorous friction with flesh-gloves and a strong coarse towel, will not only tend to depurate the blood, but it will promote a healthy action of the skin, under which it is less sensitive to the depressing influence of cold. After a time, as the strength and general powers of the circulation increase, the cold sponging may be advantageously replaced by the shower-bath. It is almost superfluous to add, that the clothing of rheumatic convalescents should consist of such materials as are bad conductors of heat, flannels, fleecy hosiery, &c.; and whenever exercise has been taken by persons who are liable to this malady to the extent of inducing perspiration—and

the more frequently and regularly this is done the better—the clothing should be at once changed, the skin having been previously rubbed dry with a coarse strong towel. The enlargement of the joints, which very frequently remains after the disease has ceased, is best combated by rest of the affected part. The limb should be placed in splints, or such other mechanical means adopted as are best calculated to ensure rest and prevent pressure of the synovial surfaces. Blisters may be applied at intervals of a week or so, and Scott's ointment applied, and the limb strapped up, or friction with stimulating embrocations, or the iodide of potassium ointment is occasionally of much benefit, at the same time giving the iodide internally. In using the iodide of potassium ointment, care should be taken to dissolve the salt in a few drops of water, or the ointment will be disagreeably gritty. Chronic rheumatism requires more than any other, attention to the functions of the skin. In the acute and sub-acute, profuse perspiration is frequently a prominent symptom. In the chronic it very frequently happens that there is not sufficient vigour in the circulation to induce perspiration without artificial aid. The great relief, indeed the comparative immunity which individuals

suffering from chronic rheumatism experience during the summer months, naturally directs our attention to the necessity of adopting measures to promote the action of the skin, and maintaining that degree of vigour in the circulation of the fibrous tissues which is least favourable to the development of the disease; and it is found by experience that no plan of treatment is effectual in which the induction of diaphoresis and free and vigorous cutaneous action do not form the leading features. One of the most valuable medicines we possess is the pulvis ipecacuan. co. at bed-time, combined with calomel and colchicum occasionally; for there is very frequently here, as in rheumatic gout, some hepatic and portal congestion.

When this is removed, small doses of the acetate of potass and iodide of potassium, combined with such doses of vinum colchici and ipecac., with or without a little tinct. opii, as the necessities of the case may seem to require, will be found the best treatment. The vehicle for these remedies may either be the compound decoction of sarsaparilla, or any bitter infusion. All that has been said with regard to the advantages to be derived from dry-air or vapour-baths, counter-irritation with blisters or stimulating

and the disease maintained the same peculiarities which characterized it hundreds of years ago, very little approach has been made towards arriving at any definite conclusion as to its true nature; for, notwithstanding modern researchers have succeeded by means of chemical tests in ascertaining the nature of the morbid deposits which take place in the seat of disease, and in detecting the same morbid matter in excess in the blood of the gouty, still one of the most recent writers on gout repudiates altogether the existence of a morbid matter, and attributes gout to venous congestion. Many others, whose opinions are equally entitled to consideration, recognise the existence of a morbid matter in the urate of soda, although they do not attempt, so far as I am aware, to demonstrate the laws which lead to its formation, retention, and accumulation in the system, and its deposition in certain parts and structures, and which, in fact, constitute an attack of gout. So far as relates to the mere description of the symptoms which take place in gout, we find none which exceed in their fidelity that given by the celebrated Sydenham in 1683. This is scarcely to be wondered at, for his descriptions of disease were sketches from life, drawn by the hand of a master; and it can be no disparagement to the

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descriptive powers of those physicians who have of late years written so ably on this subject, that they are unable to surpass that great physician, who had the advantage of seeing the disease nearly two hundred years before them, and who described it with such accuracy, that he may truly be said to have "held, as 'twere, the mirror up to nature," and by the fidelity with which it reflected the peculiarities of the malady, to have left but little scope for his successors. In reading the treatise of this distinguished physician on the disease we are about to consider, we are not merely struck with the fidelity of his descriptions, but his pathological deductions—considering the little assistance he was able to derive from all those collateral sciences which form the groundwork of modern medicine, and which in those days were not even in their infancy—evince the possession of reasoning powers of the highest order, and entitle him to the place he must always hold in the foremost ranks of the profession. But independently of the great mental powers and professional experience he was enabled to bring to bear on the subject, he enjoyed (?) in his own person peculiar opportunities of studying the malady, for in the commencement of his treatise he says, "There is no doubt but men will consider either

*the same morbid matter*, which, however, I do not pretend to determine." Now, these quaint remarks, to the effect that "the retention of the excrementitious juices" leads to the formation of the morbid matter, and that that morbid matter is identical with stone in the kidney, embody the rough facts of the case, and we see from them, that Sydenham was led by his great experience, observation, and logical reasoning to the same conclusion, which animal chemistry and the improved knowledge of physiology and pathology which exists at the present day prove to be in the main correct; but it still remains for modern medicine to show through the aid of these collateral sciences the way in which this morbid matter is generated, retained, accumulated, and ultimately deposited so as to constitute an attack of gout; and it is especially desirable to demonstrate these facts as clearly as possible, inasmuch as some of the most recent authors on the subject deny the existence of any special morbid matter. Dr. Cullen, in his first lines, gives a good description of the disease, but it is copied from Sydenham, on whose description I have already said it would be difficult to improve. But Cullen differed from Sydenham as to the pathology of the disease; he doubts and disputes the existence of a morbid matter, and considers

gout an affection of the nervous system. Dr. Prout thought that the lithic acid, developed principally during the mal-assimilation of the albuminous textures, may be considered as the characteristic feature in gout. Sir Henry Holland thinks gout depends on a *materies morbi*, which, whatever its nature, is capable of accumulation in the system, of change of place within the body, and of removal from it. Dr. Watson expresses his concurrence in this opinion, and adds, "Certain habits of life produce fulness, and richness, and impurity of blood—the same habits which breed the lithic acid diathesis; we may even conjecture the lithic acid, or some of its compounds, to be the actual *materies morbi*."

Dr. Garrod, who has demonstrated the existence not only of uric acid and urea, but of urate of soda in the blood of gouty persons, says in his paper, "Gout would thus appear partly to depend on a loss of power of the uric acid secreting function of the kidneys; the premonitory symptoms, and those also which constitute the paroxysm, arising from an excess of this acid in the blood, and from the effort to expel the *materies morbi* from the system." Dr. Garrod, however, subsequently modifies this opinion, that gout is caused by any diminution of the eliminating power of the kidney, and says—"At present I

do not wish to advance any hypothesis as to the cause and nature of gout, considering that many further researches should be made on the subject before a theory of the disease could be advanced with safety." That the kidneys, in common with the other abdominal viscera, are in a state of venous congestion, both before and during an attack of gout, no one I think will venture to deny. This congestion arises not only from the general plethora of the circulation, but from the great demands that have been made on these organs to eliminate the urates with which the circulation is loaded. The excess of urates in the urine for some time previous to an attack of gout, their diminution during the attack itself, and their recurrence in excess on the subsidence of the paroxysm, all tend to prove that during a paroxysm of gout the excretory powers of the kidney are diminished. This impaired function of the kidney is in all probability due to the irritation in the tubuli uriniferi, caused by the passage of the urates producing a degree of venous congestion which is most unfavourable to absorption, and under which the Malpighian bodies—the water-eliminating portion of the kidneys—are unable to excrete sufficient fluid to carry off any quantity of these very insoluble urates. That this

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diminution in the excretory powers of the kidneys, both as regards the fluid and solid constituents of the urine, tends to that increased accumulation of the urates, and to that oppressed and loaded state of the circulation most favourable to an attack, I think there can be no doubt; but we must not look on this as the cause of gout alone. We have to remember that this condition of the kidneys is itself only an effect of other causes; that it is, in fact, the result of over-work, from the efforts which these organs have been making to throw off the excess of urates with which the circulation is loaded.

Dr. Gairdner, who is one of the most recent writers on the subject, and who has produced a work which combines the elegant erudition of a scholar and a gentleman with the practical knowledge of an accomplished physician, not only denies, but almost ridicules, the existence of a morbid matter, and attributes gout to venous congestion. I regret especially to be at issue with one who has done the cause so much service as I consider Dr. Gairdner has, by his experiments showing the relative proportions of urea and uric acid to each other in the urine of the same individual before and after an attack of gout, and I am at a loss to understand how Dr. Gairdner can disregard the evidence of his

own experiments, and attribute gout to venous congestion.

Although I do not for a moment deny the influence which venous congestion exercises in leading to the deposition of the morbid matter, I do contend that without the retention of an excess of urates in the blood we should have no deposition of these salts, and consequently no gout; for we often see a much greater degree of venous congestion where the urates do not exist in excess, and no gout takes place. Take as an illustration of this argument, valvular disease of the heart, in which venous congestion exists not unfrequently in the greatest possible degree, producing hydrothorax, ascites, apoplexy, &c., but not gout. Chemistry demonstrates the existence of urate of soda, an unnatural and unhealthy product, in the blood of the gouty; chemistry detects it in excess in the urine before and after an attack of the disease; and chemistry detects it in the morbid deposits of the affected structures. In the face of such evidence as this, it appears unreasonable to deny that the formation, retention, accumulation, and subsequent deposition of an abnormal element like the urate of soda must exercise an important influence on this disease, if it does not constitute the disease itself.

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Venous congestion no doubt exercises its due influence in leading to the deposition of the *materies morbi*; but to say that gout is the result of venous congestion alone appears to me not only incorrect as regards the facts, but it appears to be giving support to the opinion that the paroxysm of gout is the disease itself, instead of being nothing more than the outward and visible sign, the mere local manifestation by which the vitiated condition of the blood and the overloaded state of the circulation is indicated. Let us, then, endeavour, like able detectives, to trace these urates from their first formation to their ultimate deposition.

In a state of health the blood is a solution of the food, chemically acted on by the gastric, hepatic, and intestinal juices and the oxygen of the atmosphere. It is the means through which animal heat is maintained; it is the means by which new materials for the separation of worn-out structures are taken, as it were by water carriage, to the points at which they are required, and by which the effete and worn-out tissues are brought back to their various emunctories. So long as a balance is maintained between the supply of food and the waste of tissue—provided always that the supply is of a proper nature and quality, that the digestive and assimilating pro-

cesses, in which we must include perfect and free respiration, convert that supply into healthy blood, that the circulating organs act with sufficient vigour to carry the new materials for the reparation of tissues to the various points at which they are required, and to bring back and eliminate from their respective emunctories those effete and noxious matters which have already served their purpose in the animal economy—we have a state of purity of blood under which gout cannot exist. But let an opposite state of things occur, let the supply of food habitually exceed the waste of tissue, or, owing to some impaired state of the digestive organs, let the process of assimilation be imperfect, or let the action of one or more of the great emunctories be impeded, and the carbonic acid, bile, urea, and watery fluids with which they are in combination be retained, not only is a plethoric condition of the circulation rapidly engendered, but those effete nitro-carbonaceous elements, in the shape of retained bile or urea—the products of errors in diet or defects in excretion—by their retention and accumulation in the circulation, become in their turn serious causes in the induction of those changes which are most favourable to the development of gout. It therefore becomes essential, before we can

arrive at anything like a definite or rational conclusion of what gout is, that we should take a brief review of those circumstances which act so important a part in leading to the formation, retention, and deposition in particular structures of those nitro-carbonaceous elements without which the disease cannot exist. Among these, excesses and errors in diet hold the first place, not merely from their being of the most frequent occurrence, and the evils resulting from mal-assimilated food leading to a vitiated and impaired condition of the blood ill-adapted for the processes of nutrition, but because they also lead to the accumulation in the blood of elements which should be thrown off from it, and which, by their retention, render it less stimulating to the brain and nervous system. Under the feeble stimulation of this impure blood the functions of circulation and respiration, which are principally supplied with nervous influence through the nerves of organic life, are less efficiently performed, and a degree of torpor and inertia is induced, which again becomes a cause of mischief, by engendering habits of indolence which are unfavourable to the various processes of excretion.

## CHAPTER II.

Subject continued—Class of persons who are exempt from gout—  
Reasons why—Persons most liable to gout—High development of  
the nervous system ill adapted to excesses in diet—How excess  
of stimulating ingesta induces condition of circulation favourable  
to gout.

WE eat, or rather we should do so, in order that we may live; too many of us live in order that we may eat. But the laws of nature, although admitting of considerable relaxation, cannot be entirely perverted without our being called on to pay the penalty in loss of health. Deficiency of food leads to exhaustion and emaciation; excess of food to repletion and all the evils that follow in its train. All men are acquainted with these simple facts, but how few trouble themselves to reflect on the mechanical, chemical, and physiological changes which their food has to undergo before it can be converted into blood; fewer still trouble themselves about the nature of their food and its adaptability to the maintenance of health. Most men, if you ask them why they eat, will tell you because they are hungry, or because they like it, or because they dislike still

more to go without. It is this gratification of the palate, and ignorance of the real purposes for which we eat, as well as a general want of knowledge of the laws on which health depends, that lead in many instances to those excesses and errors in diet which are so prevalent among the well-to-do classes in this country. It is no part of our business at the present time to discuss the physiology of digestion—it is sufficient for our purpose to recognise the fact that the object in eating is, although primarily to gratify the cravings of hunger, ultimately to prepare materials for the production of blood. We all know, as a general rule, that excess in eating or drinking is the commonest cause of the thousand and one bottle and table imps that infest social life in this country under the various forms of dyspepsia. The question will be asked, what is excess? This question, in the great majority of cases, can be best answered by the individual who asks it. Some men can take large quantities of food, and of a quality that with the majority would be most indigestible; others are unable to convert even moderate quantities of the most bland food into healthy chyme. This tendency to dyspepsia may be either hereditary or acquired; when hereditary, it is usually found to exist in persons of a delicate, and highly nervous

tendency ; when acquired, it is frequently the result of prolonged or excessive intemperance. It has occasionally occurred to me to meet with men who express no little indignation at the application of the word intemperate to their habits of life ; they think it applicable only to drunkards, and although they admit that they take large quantities of food, and take their wine freely, they wont be told they are intemperate. This difficulty in convincing a man who takes more than he wants, but not more than he can carry, that he is intemperate, leads us to the consideration of who are the class of persons who suffer from gout. We don't find the disease among that class of poor persons who live in our large towns, whose occupations are sedentary, and who drink gin and beer to an excess that is frequently indirectly, if not directly, destructive of life. We see in the habits of life of these individuals several circumstances most favourable to the development of the disease, impure air, deficient exercise and excess in drink, but why have we in this class of persons no gout? Simply because in their diet there is a deficiency of nitrogenous elements. Almost all their money is spent in drink, they have not the means of procuring an excess of food, and, owing to the loss of appetite from excessive drinking, they would be unable to

eat it if they had it. They therefore do not get that excess of supply over waste, in the nitrogenous elements of their food, which leads to that essential pre-existing condition for the development of the disease—the accumulation of urates in the circulation; if they did they must inevitably suffer from gout, as all the decarbonizing functions are impaired, owing to the secondary and sedative effect of stimulants in depressing all the vital functions. Take another class of persons who are free from gout—agricultural labourers, sportsmen, &c., men who take strong exercise and live temperately, and we find no gout; why? Supply and waste are balanced; the supply of food is not excessive, and the powers of the digestive organs are not impaired; wholesome food becomes converted into healthy chyme; the liver is not over-stimulated, either by excess of congestion or by having to do the work of the other decarbonizing organs; it pours forth an abundant supply of bile, and thus assists in depurating the blood from superfluous carbon, and thus converts healthy chyme into good chyle, which, being absorbed into the circulation, its albuminous principles become raised, by the absorption of oxygen in the lungs during free and vigorous respiration, a grade higher in the animal scale, namely into

fibrin, which Mülder describes as a deutoxide of protein, and which is the reparative material for repairing that waste of the muscular tissue which is always taking place under strong exercise and consequent rapid oxidation. Dr. Watson in his lectures, in speaking of the comparative immunity which strong exercise afforded, says, "yet gout used to be exceedingly common in the old-fashioned fox-hunter, who rode hard, while he also lived hard." This is quite true; but then, as now, we had occasional long frosts, during which he lived harder, for he drank all day, and took no exercise at all. Now the modern fox-hunter belongs to a different species, at all events as regards his habits of life, for he does not drink to excess, but smokes, reads, and submits to his fate like a Christian gentleman, and escapes the gout.

Although it is no part of my present undertaking to enter on the defence of smoking, and thus involve myself in the great tobacco controversy which has recently agitated the world, I feel compelled to acknowledge the truthfulness of the words of the poet, when he says—

"Tobacco has dried up the floods of port  
Which our forefathers swallowed by the quart."\*

The most confirmed *bon vivans* and the great-

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\* G. J. Cayley's "Sir Reginald Mohun."

est martyrs to the gout in these days, seldom drink to drunkenness; they seldom go beyond the exhilarative stage of intoxication, but they frequently do this habitually; and we shall presently see, when we come to investigate the pathology of gout more minutely, the great influence which excess in drink without amounting to drunkenness, when combined with high living, has in the induction of this disease.


Having considered the class of persons—females excepted—who are most exempt from gout, it becomes necessary to refer to those who are sufferers from the disease. With regard to the kings, princes, *et hoc genus omne*, to whom Sydenham refers as sufferers from gout, we must remember that, in pulling through the troubled waters of life, they invariably get the easiest oars in the boat, and from their earliest years lead a life of luxury and indolence which is most favourable to the induction of the malady; but one seldom meets with these *raræ aves*; we must descend lower in the social scale, and then we find that it is now as in Sydenham's time—that the gout attacks more wise men than fools. We find it among statesmen, lawyers, professional, literary, and mercantile men: we find it especially among men of high intellects and fine feelings, whose lives are sedentary, and

whose occupations entail on them much mental anxiety. Such men not only feel acutely all mental impressions, but the mere animal effect of rich and stimulating food produces in such temperaments a more rapid and intense excitement, and is subsequently followed by more severe depression than in persons of a phlegmatic constitution, but we frequently see gout among men who, as a class, do not undergo any severe mental labour. Take, for instance, those stalwart specimens of the yeomanry of England, whom Mr. Punch delights to depict as distressed agriculturists, and who may be seen at agricultural exhibitions almost rivalling in bulk of limb and breadth of back their magnificent cattle. Such limbs and thews speak volumes for the beef and beer of old England. Nothing is further from my intention than to attribute to these gentlemen a mere animal existence, or to consider them as in any way deficient in intelligence; but the happy and equable nature of their lives, and their, in many instances, prosperous circumstances, preclude much mental care, and yet they not unfrequently suffer from the gout; and when they do so, the attacks partake of a more decidedly inflammatory character than we see in any other class of persons. The youth and manhood of these gentlemen are passed in

vigorous exercise in the open air, not only in the pursuit of their ordinary occupations, but in following those manly and athletic sports for which the temperate climate of this country is so well adapted. As years advance upon them, the pursuits of both pleasure and business are followed with less vigour. Under these altered circumstances, circulation and respiration become more feeble, and the waste of tissue less. There is consequently less demand for new material to take the place of that which was formerly burnt off by strong exercise. To maintain health under these altered circumstances, the supply of food should be diminished; but this is never done, and that redundantly plethoric and overloaded state of the system is brought on under which gout, though one of the most painful, is one of the least evils that may ensue at any time. Here we see the disease in a class of men who live on the fat of the land, and who, while they take strong exercise, do so not only with impunity, but with success, so far as the mere development of physical power, growth, and health is concerned; but the same diet without exercise and without any increase of mental care, soon produces that excess of supply over waste, and that accumulation of effete nitro-carbonaceous elements in

the circulation which terminate in gout. Again, we frequently see the gout among the upper servants of our nobility. Now, however heavily the cares of state may press upon their masters' minds, these worthies cannot be said to be overwhelmed with mental cares; their principal anxiety is to do as little as they can, and eat as much as they can, and they are generally tolerably successful; but it must be admitted that these persons are generally men who, although not educated and not going through any great mental wear or tear, are frequently men of superior intelligence to the great body of their class; and it is this higher development of the nervous system which gives at one and the same time the higher intelligence and the greater liability to feel the evil effects of high living and little exercise. These cases are merely brought forward to show that although mental anxiety and overwork are frequent and fertile sources of gout, that they are by no means the essential and only causes, and that where a predisposition exists, a life of ease and indulgence, although free from mental cares, will very frequently induce the gouty diathesis.

The process of digestion, as far as relates to the stomach and intestines, is not in itself altogether a process of nutrition, but one of conver-



sion. By eating to excess—and excess may arise from the improper nature as well as from the quantity of the food—we impair the converting powers of the stomach and alimentary canal, and we clog the mechanism of life by pouring into the circulation a larger quantity of chyle than is required to supply the place of that loss which occurs during the various processes of oxidation throughout the body. The process of digestion commences from the time the food first enters the mouth and mastication begins; and it is not unfrequently destined to go through this process in a very imperfect manner in the gouty, sometimes from the voracity with which they eat their food, but more frequently from the defective state of their teeth, and the disease occurring mostly towards the middle period of life, and generally among men whose habits have not conduced to their preservation. The great evil of excess of ingesta, as far as the stomach is concerned, consists in its over-stimulating the mucous and nervous coats of that organ; a larger quantity of blood is sent to this viscus under these circumstances for the secretion of an increase of gastric juice, to meet the increased demands of assimilation. As soon as the first excitement resulting from this over-stimulation has subsided, a state of depression

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or exhaustion of the mucous and nervous coats of the stomach supervenes, but this is not at first excessive. The organ seems to be endowed with great resiliency, and soon recovers its tone; it is only after repeated excesses that the assimilating power of the stomach seems to be much impaired. But we have in the immediate neighbourhood of the stomach another organ—the liver—with which it maintains an intimate alliance and sympathy. This is not merely the sympathy of contiguity from their being neighbours, but they are intimately associated in their functions, and they both derive their nervous and vascular supply to a great extent from the same sources. When the stomach is over-stimulated, and an inordinate quantity of blood is sent to it for the formation of an increased quantity of gastric juice, the same stimulus is felt in the liver, and an additional quantity of blood is sent to that organ for the secretion of bile to assist in converting the chyme formed by the stomach into chyle. But in many individuals there does not appear to be the same amount of resiliency in this organ that exists in the stomach; it wont permit its circulation to be constantly over-excited without breaking down in its functions. The over-distended capillaries either fail to secrete bile, or what is more probable, if they

do secrete it, the distended vessels, by pressing on the commencement of the biliary ducts, prevent its elimination through its proper channels. Very many evils result from this clogged and overloaded state of the hepatic circulation, and although we may be unwilling to attribute gout to functional disturbance of any one organ, we shall on careful investigation be compelled to admit, that this congested state of the liver is the first link in the chain of morbid events, of which gout is the last. When the excretion of bile through the biliary ducts is thus arrested, not only is the process of chylification imperfectly performed, not only does the separation of the excrementitious from the recrementitious portion of the chyle become impeded, but the peristaltic action of the bowels is impaired; they become loaded with fœces, and form a very material impediment, not only to the portal circulation, but, by their pressure on the ascending cava, they assist in preventing a free return of blood from the lower extremities.

On examining the region of the liver we can often feel the outline of the organ extending far beyond its proper limits into the epigastric and left hypochondriac regions. The mechanical results arising from this enlarged state of the liver are, first, that it impedes by its pressure on

the ascending vena cava the return of blood from the lower extremities; secondly, by pressing the diaphragm upwards, it diminishes the capacity of the chest, and retards and obstructs the functions of circulation and respiration. The physiological and chemical ills resulting from the retention of bile, are, first, that the retained bile, unable to escape by its ordinary channels, is conveyed by the venæ cavæ hepaticæ directly into the ascending cava, and from thence into the heart. Now this retained bile contains a very large per centage of carbon, and when it is thus carried into the circulation it acts as a very powerful sedative on the brain and nervous system, and thus renders the heart, through the medium of the nervous system, less sensitive to the stimulating influence of the blood, but in addition to the diminished sensibility of the heart, through its nervous energy being impaired, the blood itself is less stimulating, not merely from the carbon of retained bile, but this condition of the liver is very often brought on and maintained by too free indulgence in vinous and spirituous liquors. The basis of all fermented liquors, whatsoever their name or taste, is alcohol; now alcohol contains 53 per cent. of carbon. The fluids we drink are for the most part, especially when taken on

an empty stomach, carried at once, through the medium of the portal circulation, directly to the heart; and although alcohol, when thus absorbed, acts primarily as a stimulant, the subsequent sedative effect of the carbonaceous elements of retained bile and alcohol is most depressing. Under the depressing influence of this impure blood, the heart acts very feebly; and the processes of circulation, both pulmonic and systemic, are so imperfectly carried on that the elimination of carbon, from both those great decarbonizing emunctories—the skin and lungs, is so inefficiently performed, that a further accumulation of carbonaceous elements takes place in the blood, and is in itself almost tantamount to a case of poisoning.

## CHAPTER III.

Function of respiration, how impaired by excess of food and deficiency of air and exercise; its influence in generating the gouty diathesis—Intellectual pursuits, mental anxiety, high living, and little exercise combined, generate the gouty diathesis without any hereditary taint.

WE now have to return to the chyle. Owing to the absence or diminution of the quantity of bile, the process of chylication is imperfectly performed—to what extent we are unable to say; but if the bile serves any purpose beyond that of assisting in defecation and purification of the blood, its diminution or absence at the time a larger quantity of chyme from heavy feeding is thrown into the duodenum than usual, must be attended with serious consequences to the complete elaboration of the chyle, which we must now follow up the thoracic duct to the lungs, where it has to undergo the process of sanguification or conversion into blood. We are all apt, while in a state of health, to pay too little regard to the important function of respiration. Unless we perceive some appreciable deterioration in the air we breathe, or some impediment

in the performance of the function itself, its influence on health is disregarded. Half the mercantile and professional men in London go from their beds to the conveyance that takes them to their place of business, and *vice versâ*. If any of these men were put into an ill-ventilated room, they would consider that a grievous wrong had been done them, and yet they daily neglect to ventilate themselves, and we see the evil results in the turgid and bloated countenances, the sodden flesh, the rapid and increasing corpulency, the facility with which they contract, and the rapidity with which they sink, under epidemic and endemic diseases, as compared with their (in this respect) more fortunate country cousins, whose purity of blood and vigour of constitution, arising from the more healthful habits of country life, enables them the better to resist the approach of disease, and to bear up against its debilitating influence when it does occur. The habitual neglect of the due fulfilment of this function arises from ignorance of its importance, and will continue to exist until the first principles of physiology are made an essential part of a good general education. After the food has been converted into chyle it is absorbed by the lacteals, passes up the thoracic duct, from whence it passes through

the descending caval veins to the right side of the heart, from whence it is propelled into the lungs, in the capillary network of which it undergoes the final process of sanguification. The degree of perfection with which sanguification is affected, depends not only on the process of respiration being efficiently carried out, but the previous stages of primary assimilation—viz., chymification and chyfication—must have been duly and properly performed, and the supply of chyle from which the new reparative material is to be obtained must not exceed that which is required for the maintenance of animal heat, and the repair of that loss which is continually going on. Liebig has shown, that during the oxidation which takes place in respiration, the food is burnt as effectually in the lungs, as if it were undergoing combustion in a crucible. It is essential, therefore, to the preservation of health, that a balance should be maintained between the combustible material and the powers of combustion; in other words, between the quantity of chyle thrown into the circulation and the effete matters which are burnt off during respiration. Excess in food is overloading the grate with fuel. The carbonaceous elements which Liebig calls the fuel-food, are, under excess of food and defective respiration, not

burnt off, and the nitrogenous elements are not raised to that perfection which fits them for the various reparative processes; hence arises, under high living and feeble respiration, that state of repletion, which is most favourable not only to the induction of gout but many other diseases dependent on plethora. The more perfect, therefore, the respiration, the more complete is the purification of the venous blood from the carbonaceous elements with which it is loaded, and the greater the absorption of oxygen, the more complete is the conversion of the albuminous principles of the chyle into that more highly organized fibrin, by means of which repair of the muscular structures is to be effected. But the important influence which respiration exercises over health is not limited either to the burning off in the lungs the carbonaceous matters which are constantly being thrown into the circulation, as products of the amylaceous, saccharine, and fatty portions of our food, or to the raising the nitrogenous elements of our nourishment, derived from the gluten of vegetables and the lean of meat, to that higher degree of fibrination which fits them to be built into the animal fabric, but two other most important functions are performed; during the combustion that ensues by the absorption of

oxygen from the inhaled atmospheric air; the dense venous is converted into the specifically lighter arterial blood, and heat is generated, but not evolved; for the arterial blood, in becoming specifically lighter, has acquired an increased capacity for caloric, which becomes latent in it, and which is disseminated with it wherever arterial blood circulates. Another portion of the inhaled oxygen is supposed to be absorbed by the red globules, and to be by them carried to the systemic capillaries, where the process of secondary or destructive assimilation takes place by the action of the oxygen on tissues which have already served their purpose in the animal economy. Fat becomes, during this oxidizing process, converted into carbonic acid and water, and is, with the heat which now becomes sensibly developed, carried off by means of the perspiratory fluid. The muscular tissues which have already done their work, and whose turn it is to yield to the destructive influence of oxidation, become successively transformed through its influence into creatine, creatinine, uric acid, and urea, the carbonized products of this combustion, are thrown off partly by the perspiratory fluid, and partly by the venous blood on its next return to the lungs, while the nitrogenous compounds of destructive assimila-

tion, viz., uric acid, urea, &c., are filtered off by the kidneys, and although, in the present state of our knowledge, we are unable to state with certainty the precise changes that take place, and the order in which they occur—from the moment that the destructive action of oxygen on the muscular tissue commences, till their final elimination in the form of urea—still all experiments prove, *cæteris paribus*, that the more perfectly all the great decarbonizing functions are performed, the more complete is the conversion of effete nitro-carbonaceous materials; whether derived from excess of nitrogenous ingesta or the destructive assimilation of muscular tissues, into that most soluble of all forms for their removal, namely, urea.

Such is a brief outline of the changes which should and do take place during the important process of respiration; whatever, therefore, tends to accelerate and perfect this process, promotes a more healthy condition of the blood. It is impossible to attach too much importance to the great influence which defective respiration, conjoined with high living, has in the development of gout, for when this great vital function is imperfectly performed, the carbonaceous elements, which are constantly being passed into the circulation with the new chyle, are retained,

and render the blood less stimulating to the heart and nervous system, so that the contractions of the heart are constantly becoming more feeble, and the elimination of carbonic acid and water from the lungs and skin constantly diminishing, until at last a degree of plethora is induced, which is most favourable to the development of the disease. But it is not from the retention of the carbonaceous and watery portions of the blood alone that the great and ultimate mischief arises. We have seen that under high living and little exercise, which entails feeble respiration, the nitrogenous portions of the food are not raised to that proper standard of fibrination which fits them to be incorporated into the animal fabric; and even if they did, under feeble respiration, attain perfect fibrination, they would not be required for their normal purposes—the reparation of muscular tissues; for under a life of inertia the waste of tissue is but slight. What then is to become of this excess of nitrogenous materials? It has no alternative but that of yielding to the oxygen contained in the red globules, and undergoing the process of destructive assimilation; but, owing to the small quantity of oxygen absorbed under feeble respiration, the red globules do not contain sufficient oxygen to oxidize the excess of

albuminous materials in that efficient manner which should ensure their conversion into that most soluble of all forms for removal, namely, urea. A very large portion of the albuminous elements which are in excess are therefore, under this feeble metamorphosis of tissue, only partially oxidized and thrown into the current of the circulation as uric acid, instead of urea. Hence we find so large a quantity of the urates in the urine of the gouty previous to an attack. So long as the eliminating power of the kidney remains unimpaired, this excess of urates is of little moment, except as an indication of the overloaded and oppressed condition of the circulation, and an intimation of what will occur, sooner or later, unless remedial measures are adopted. Unfortunately, the errors and excesses in diet, and the deficiency of exercise, which have led to this overloaded state of the circulation, are seldom abandoned until a degree of plethora is induced, under which the kidneys participate in the general visceral congestion, and are unable to eliminate sufficient water to carry off the urinary principles as fast as they are generated. We thus see how high living and sedentary habits, the one by overloading the grate with fuel, and the other by diminishing the force and frequency of the respiratory pro-

cess, and thereby impeding the combustion of the hydro-carbonaceous elements of our food, and the elevation of the new nitrogenous elements of the chyle to that standard of vital perfection which fits them to be incorporated with the living structures, and at the same time preventing the reduction of the old and effete nitrogenous elements into those soluble forms best adapted for their removal from the circulation, conduce to the development of the gouty diathesis. Although the causes above alluded to probably exercise the greatest influence in the production of gout, there are others which cannot be disregarded. Among these, intellectual pursuits have held a prominent place, from the time of Sydenham downwards. That distinguished physician consoles himself, in his sufferings from the gout, with the reflection that it affects more wise men than fools. This is not to be wondered at. Men are not born wise, and wisdom is not to be shot flying, or caught in a gallop across country. Those who seek to make great reputations in the arena of politics, literature, or the learned professions, must read hard and sit long, and although this consumption of the midnight oil may lead to the acquisition of much learning, the lamp of life burns all the more dimly for it,

as evinced by the pale cheek and sunken eye of the zealous student.

The influence of mind on matter in the induction of disease has been notorious from the earliest periods. Plato tells us, "*Omnia corporis mala ab anima procedere.*" For my own part, I do not think that mere mental labour, apart from mental anxiety, unless conjoined with deficient exercise and heavy feeding, exercises any very great influence in the production of gout, beyond this, that men of intellectual tastes are, generally speaking, men of high nervous organization, in whom the stimulating effects of high living are more rapidly felt, and the subsequent depressions, arising from the sedative effects of the carbon of retained bile and alcohol, are more permanent. But although mere mental labour, apart from sedentary habits and high living, may not exercise any great share in the induction of gout, it is quite a different matter with mental anxiety; and, unfortunately, the almost universal prevalence of anxiety of one kind or another, is a fertile source not only of gout but of many other diseases. But, with regard to the disease we are now considering, the influence which mental anxiety has in its induction may be traced to the peculiar power

which it exercises in impeding the action of the liver, and thereby leading to that semi-jaundiced condition of the circulation which leads men to despond, and to regard everything through a melancholy and distorted medium. The sedative and depressing effect of retained bile also engenders a degree of inertia and a disinclination to avail oneself of one of the most useful remedies—strong exercise in the open air. Too often, instead of adopting this, Nature's great remedy, the denizens of our large towns fly to drink, "to drive dull care away." It is unnecessary to add that such a course only increases the evil it is meant to remedy.

It is impossible to walk through the streets of this modern Babylon and watch the countenances of those we meet, without seeing how deeply the troubles of this world leave their traces on the care-worn faces of those who are engaged in the daily struggles which they have to encounter in the battle of life. The late Dr. James Johnson was accustomed to speak of this as the wear and tear malady, and he says that the reason of its greater prevalence in London than in Paris is, that "in London business is almost the only pleasure; in Paris pleasure almost the only business." In this country, in the great majority of cases, espe-

cially of those who suffer from gout, the hours of relaxation are devoted to pleasures which, instead of diminishing the cares and anxieties of life, render us less able to contend with them. John Bull delights in dinners and charities. We inaugurate, celebrate, and end everything with a dinner. "There can be no objection to a good dinner, it lubricates business." So said Sir W. Temple. Unquestionably it does, and men's purse-strings too. Far be it from me to say one word that should stay the stream of charity, or divert from so good a cause the gold which gushes from Mr. Bull's breeches pockets when his inward man is renovated with the good things of this life, and his bump of benevolence stimulated by the eloquent appeals of an enthusiastic chairman in behalf of the poor, the bereaved, or the afflicted. The late Dr. Woolcot, more commonly known as Peter Pindar, the celebrated poet laureate to George the Third, was not an anatomist, but he was a great observer of human nature, and he says—

"The road to human hearts I find  
Lies through their guts, or I mistake mankind."

There can be no objection to these dinners, provided a man finds that he is endowed by nature with sufficient digestive vigour to bear the anxieties and confinement of business, and

these excesses in eating and drinking without losing his health; but few men are enabled to bear, for any great length of time, the cares and responsibilities of professional and mercantile life, combined with sedentary habits and high living, without engendering that condition of the circulation most favourable to the gouty diathesis, even where no predisposition existed.

## CHAPTER IV.

Cutaneous action, its influence in preventing gout and lithic acid calculi—Hereditary tendency considered—Inverse ratio of development of the lungs and liver throughout the animal kingdom—Hereditary tendency to gout aggravated by mismanagement in early life—Recapitulation of arguments, showing how the various exciting causes generate that condition of vascular system favourable to gout.

WE must not omit to notice the great influence which free cutaneous action exercises in the purification of the blood, and in the maintenance of that condition of the system under which the development of gout becomes so great an improbability, as almost to justify us in saying, it is an impossibility. "The cuticle or outer skin of most animals is perforated by numerous pores,—these pores are the outlets of minute spiral vessels which penetrate through the skin into the cellular substance beneath. In the human cuticle, the pores are more numerous in some parts of the body than in others, but the outer skin of a full-grown man is sprinkled over with about seven millions of them, while the united length of the spiral vessels connected

with them is reckoned at twenty-eight miles. Through these vessels we pour out constantly the solid and fluid substances which form our visible perspiration. But through them air also enters and escapes continually in a healthy state of the body, as it does from the air vessels, and though the total quantity of this kind of work done by the skin is very much less than that which is performed by the lungs, yet it is both material in amount and of essential importance to the general health of the body."\*

"Now the skin of a full-grown man exhales in twenty-four hours, and in ordinary circumstances, from one-and-a-half to two pounds of water in a state of insensible perspiration."

"The difference between this weight and that of one-third of the whole food, solid and liquid, represents the quantity of water daily discharged from the lungs. It is not far from the truth to say, that for every pound-and-a-half discharged from the skin about one pound is given off from the lungs." "The quantity of carbonic acid gas given off from the lungs of a full-grown man varies from five to fifteen ounces in the twenty-four hours." "The quantity given off from the skin varies from a thirtieth to a nine-

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\* The late Professor Johnson's "Chemistry of Common Life."

tieth of that which escapes from the lungs: in man it probably averages about one-sixtieth. This is equal to fifty or sixty grains of carbon in the twenty-four hours. Bodily exercise greatly increases this quantity, as it does that of the watery vapour. The human skin, when a person is in motion, perspires three times as much as when he is at rest." The influence which free cutaneous action exercises in diminishing the formation of uric acid is of importance, not only in the gouty, but the tendency to calculous affections is very much decreased by maintaining the action of the skin in its full integrity.

The late Dr. Golding Bird, in his work on urinary deposits, says—"Uric acid or urates may be deposited in an insoluble form in the kidney or bladder, and aggregating form a mass on which, by a kind of imperfect crystallization, great quantities of the acid or its salts may be deposited, giving rise to the formation of a calculus. Uric acid is of more importance than most other elements of calculous formation, not only from its constituting a large proportion of all urinary calculi, but even when they are chiefly composed of other ingredients, the nuclei on which they are deposited are in the great majority of cases composed of uric acid.

Of 374 calculi contained in the museum of Guy's Hospital, at the time I examined them, the nuclei were in 269 composed of uric acid or urate of ammonia alone." He further says, "It is also probable that the extreme rarity of calculous affections in the navy might be partly explained by the kind of vapour-bath in which sailors sleep." "The lower decks being the parts allotted to repose, the ports are, for the safety of the ship, necessarily closed at night, and the temperature of the surrounding air is thereby so exalted that the place becomes a kind of steam-bath from animal exhalations, the men being literally immersed in their own perspirations." These are the remarks of Mr. Copeland Hutchinson, who, in allusion to the rarity of calculous affections among sailors, adds,—"That from 1800 to 1815 upwards of 126,000 men were employed in the navy; of these, nine-tenths had been employed at sea from a very early period of their life. But eight were affected with stone. It appears probable that three of these were affected with calculus before entering the service; so that, taking all the cases in the navy in the period above mentioned, it cannot be said that more than 1 in 34,000 was the subject of calculus." Gout and lithic acid calculi are members of the same

family, and not unfrequently exist together. The pisiform concretions of uric acid seen in the urine of the gouty, both before and after an attack of the gout, although not so commonly seen as the fine lateritious sediment, are still of frequent occurrence, and are nothing more or less than minute calculi. Imperfect cutaneous action, conjoined with other circumstances, is as likely to produce the one as the other; while the depurating power of the kidney remains intact, the tendency is to calculous affections, when it is impaired, to gout. The next most important cause of gout which claims our consideration is what is called the hereditary tendency. That this congenital tendency to gout exists there can be no doubt; but the public entertain on this, as on many other medical matters, very erroneous opinions. When you ask men what they mean by its being hereditary, they will tell you that their father and grandfather had it, and that it has been in the family from time immemorial. They seem to consider it as an inalienable portion of their patrimony, evidently thinking that the germs of the disease are born with them; that they lay dormant for years, and are developed at a certain period of life, and that no precautionary measures can eradicate them. These impres-

sions are very erroneous, and lead to much mischief. Men are well content to shuffle off the responsibility on their progenitors, and to attribute their gout to the existence of an hereditary taint rather than to their own excesses or want of care. But while there are, on the one hand, many who, believing that no measures, either precautionary or remedial, dietetic or medical, will exempt them from the family curse, rush madly into those excesses, and bring on the disease prematurely, when by care and proper measures they might escape it altogether; there are, on the other hand, many who, by the exemplary purity of their lives and the care which they bestow on their health, deserve a better fate, but are still unable to escape the disease from the want of knowledge of its true nature and causes and the most rational prophylactic treatment for its prevention. It is therefore very desirable that more correct impressions should prevail as to the true nature of this hereditary tendency in gout. In the first place, every man should dismiss from his mind the idea that the germs of the disease are born with him and remain latent to a certain period of life. The hereditary tendency to gout consists merely in the fact that certain physical peculiarities are transmitted from parent to child; that these physical peculiarities

are frequently retained through several generations, and will on examination be found to be such as are most favourable to the induction of the lithic acid diathesis. Mr. Paget has well explained this transmission of personal peculiarities from parent to child in his lectures at the College of Surgeons, and which will be found in the "Medical Gazette" of June 15th, 1849. He says—"The characteristic property of an impregnated germ is, that when placed in favourable circumstances, all the materials of which it first consists and all that it appropriates, are developed according to the same method as was observed in the development of its progenitors; in other words, in conformity with what we may regard as a law of a specific character. In all the wonders of development that my colleague has detailed, none I think appear more marvellous than the constancy, the seeming tenacity of purpose with which the germ is thus developed to the likeness of its parent. However vast its powers of multiplication and increase—however various its metamorphoses—however far in some of these changes it may deviate from the form in which its parent generated it—however near in some it may approach the perfect character of another species—or, which is stronger still, however much alike all germs may be in their

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primal structure and earliest developments, yet through all these things, each germ moves with unswerving progress, guided by the same power as created its first parents, to the formation of a being in which the parental form and properties are reproduced." It will be asked, what are the constitutional and physical peculiarities which are thus transmitted from generation to generation, and which appear so favourable to the induction of the gouty diathesis? The peculiarity of constitution most favourable to the formation of the gouty diathesis is the nervous bilious temperament, in which a highly-developed nervous system is combined with weak digestive organs, and as a frequent consequence a weakly, ill-nourished frame, with a feeble development of those muscular tissues, the free exercise of which does so much in promoting the great depurative and nutritive functions of respiration. There can be no doubt that the exercise of organs, whether mental or physical, unless carried to excess, conduces to their perfection and development. But in this high pressure age of education, the body is often sacrificed to the mind, and that, too, without any corresponding or ultimate benefit to the mind. Without going so far as to assert that there is any absolute difference in the

structure of the brain and nervous system in the educated and uneducated classes, which could ever be made appreciable by the most minute microscopic anatomists, I feel convinced that there are certain persons and families among the educated classes in which this higher degree of nervous organization exists naturally, and is further increased by education, and is transmitted very frequently from parent to child. In this condition of the nervous system there is a very acute sensibility to external impressions, both mental and physical. We speak of the mental power with pride, as intellect; of the physical one with regret, as irritability and excitement without power. Unfortunately this peculiar state of the nervous system is not limited to the brain, but extends to the cerebro-spinal system, and through it to every organ in our bodies. The more highly-developed nervous powers of the educated and intellectual gentleman enables him to enjoy and appreciate, in the contemplation of the beauties of nature and art and in the cultivation of literature, many pleasures which would be totally inappreciable by a labourer; but if it became a question of their relative capacities for beer, we should find that the brain of the educated man would become first excited, then obscured, and then temporarily

paralysed, before the more stolid nervous system of the navy had become in the least degree excited. A drinking bout between a man of this class and a gentleman is a very unlikely thing to occur. The circumstance is merely adduced to show, that although this higher nervous development enables its possessor to enjoy intellectual pleasures, which would be inappreciable and unintelligible to a man possessing a less highly-organized and less sensitive brain and nervous system, its advantages are counter-balanced by the extension of this delicacy of organization to the digestive organs, which renders them more susceptible to any errors or excesses in diet. In such persons the effect of stimulating ingesta is more rapidly felt on the delicate mucous and nervous coats of the stomach, and through it on the brain, which becomes first excited, through the medium of its sympathy with the stomach, and afterwards congested, through the absorption into the circulation of an excess of stimulating nutriment.

The liver soon participates in this over-excitement, and becomes congested, the bile which it should excrete to assist in depurating the blood is retained, and acts as a sedative on the brain and nervous system, and secondarily on the heart; circulation and respiration become impaired, and

the carbonaceous elements of the blood, which should be burnt off, are retained, and act as sedatives in further diminishing the power with which the depurative functions are carried on; for in this peculiar organization of the nervous system the depressing influence of sedatives is felt quite as acutely as the previous exciting power of stimulants. In corroboration of these views, we find that the class of persons who suffer most from hereditary gout are those in whom the nervous bilious temperament is most strongly marked; and if we select from these, those who suffer the most, and who in fact are what are called martyrs to the disease, we shall find that they are men with large heads, narrow chests, and big bellies; hence the lungs and liver are generally developed in an inverse ratio to each other. The livers of such persons have at all times, even in a state of good health, to assist in that decarbonization of the blood, which is more efficiently performed in the lungs of a man with a large and capacious chest. Where this diminished development of the chest exists, the liver is called on to do more than its share of work; it has quite as much as or more than it can do, even if the habits of the individual so organized are temperate as regards his diet, and active as regards exercise, but when to this peculiar orga-

nization are added literary tastes, sedentary habits and an exquisite appreciation of the gastronomic art, it requires constant care to diminish that gouty tendency, which is partly due to hereditary peculiarities, and partly to the indulgence of habits, which though to be deprecated in all who are anxious to enjoy good health, are totally incompatible with it, in those possessing this peculiar mental and physical organization. This larger development of the liver, and its greater liability to congestion when the lungs are imperfectly developed, has been alluded to by Professor Carpenter, and appears to be an almost universal law throughout the animal kingdom. Professor Carpenter says, "that the less hydrocarbon separated from the blood by respiration, the more is eliminated from it by the biliary secretion appears to be a general principle throughout the animal kingdom, the liver and respiratory organs bearing almost everywhere an inverse ratio to each other in their degree of development."

The evil influence of this hereditary transmission from parent to offspring of personal and mental peculiarities most favourable to the generation of gout, is unfortunately very generally aggravated during infancy and early childhood. The ladies of this country generally discharge

their maternal duties in a most exemplary manner, at all events while leading a quiet and regular life in the country, except it is from excess of anxiety and too great an inclination to dabble in physic for every slight deviation from their standard—very often a delusive one—of health. But the late hours and excitement of fashionable life are very unfavourable to nursing. Under deficient nutrition the child pines, the mother becomes more excited and more anxious, the more the intellectual predominates over, or is combined with the mere animal woman, the greater becomes the anxiety to discharge the maternal duties, and the less becomes the ability to do so, the milk becomes sour, the child suffers from diarrhœa, a wet nurse is sought and obtained, and very often but little judgment is shown in the selection. Almost all wet nurses think it is their duty to eat as much animal food, and to drink as much porter as they can, and their mistresses generally encourage them, not considering that any other requisite for nursing is required than mere animal strength. The consequence is, that these women become over-fed, and the infant, instead of getting as it did previously too thin and watery a diet, now gets one in which there is more sugar and case in than its weakened digestive organs can assimilate.

It now becomes constipated, and its liver congested, then comes grey powder, then more improper food, more grey powder again, then more improper food. During all this time the poor infant is not allowed a mouthful of what would do it more good than anything else, fresh air, because it is taking grey powder. If, instead of being shut up in-doors, the infant was allowed to breathe the pure air of heaven, it would soon be found that Nature was the best doctor; the carbonaceous impurities with which its food abounds would be burnt off by combination with the oxygen of the atmosphere, and the albuminous principles would attain that perfection which would enable them to become incorporated as healthy muscular tissue, but instead of having fresh pure air, the child is shut up in a hot room and over-fed.

Can it be a matter of surprise that the vessels of the liver lose their contractile power and become congested, when the child is treated like a Strasburg goose, and as if its liver was to be made into a *paté de fois gras*, for this over-feeding and high temperature is the precise treatment that the geese in preparation for this delicacy undergo in order to acquire the proper bulk of liver. If, instead of physicking the child, we physicked the nurse—gave her a less stimu-

lating diet, and made her, as well as the child, ventilate themselves daily by pure air and exercise, we should stand in no need of grey powders, and we should avoid the premature over-stimulating and weakening of organs naturally weak. The same errors of over-feeding, and deficient air and exercise, which exist in infancy, prevail through early childhood in half the families of the higher and middle classes in this country, and it is not until a boy gets to a public school that he gets emancipated from these excesses of feeding and of flannel. If he has a precocious intellect and a weak frame he remains at home, where mental cramming is soon added to the other excesses and errors. In the majority of these cases the premature blossom seldom ripens into matured fruit, the puling child becomes, in the course of time, the sickly youth, and early manhood becomes blighted by gout, stone, and other diseases, which in a healthy constitution, and under that fine physical education which makes the gentlemen of this country excel in all pursuits that require courage and stamina, are generally considered incidental to advanced life and decaying powers.

Having seen in the preceding pages the influence which excesses and errors in diet have in

impairing the digestive powers of the stomach, and in causing congestion of the liver—having seen how congestion of the liver, by pressure on the biliary ducts, impedes the elimination of bile, and thus interferes with the chyfication of the chyme—having seen how a portion of the retained bile, being carried into the circulation, acts as a sedative on the brain and nervous system, and renders the arterial blood less stimulating to the heart—how, under the depressing influence of this impure blood circulation, and, as a consequence, respiration becomes feeble, and the carbonaceous elements of venous blood are partially retained, and render the vital fluid less adapted to the purposes it is intended to fulfil—having seen also how the imperfectly elaborated and redundant chyle, owing to the diminished absorption of oxygen which takes place under slow and weak respiration, becomes only feebly sanguified and but ill-adapted for the reparation of the animal fabric—how this feebly-organized fibrin, under the slight waste of tissue that takes place in an individual leading a sedentary life, is neither adapted nor required for the purposes of repair, and, as a consequence, is retained in the circulation, where it has to undergo the process of destructive assimilation before it can escape, but that owing

to the small quantity of oxygen absorbed by the red globules, and the large mass of imperfectly sanguified matter to be oxidized, this process is only imperfectly and feebly performed, and ceases at uric acid, instead of, as when oxidation is more effectually carried on, at urea ; having seen also how, as a consequence of this imperfect metamorphic action, uric acid and its salts appear in large quantities in the urine of the gouty previous to an attack—having seen also that under a life of inertia, and the feeble respiration and circulation attendant thereon, the quantity of watery halitus given off from the lungs and perspiratory fluid from the skin daily diminishes, and that, as a natural consequence of this inactivity, the serous as well as the solid constituents of the blood daily increase, until a degree of plethora and impurity of the whole vascular system is induced, which is not only opposed to the circulation being carried on with due vigour, but is also conducive to that congestive state of the vascular system in general, and of the kidneys in particular, which is so remarkable in this disease, and under which absorption goes on so slowly, that these organs are no longer capable of eliminating from the circulation those nitro-carbonaceous products of repletion, viz.,

uric acid and urates—having seen also that in certain individuals of a peculiar organization, which is transmissible from parent to child, that these results are more easily induced than they are in other persons, we may now proceed to inquire what gout is, and how an attack takes place.

## CHAPTER V.

Different kinds of gout—Premonitory symptoms—An attack of gout described and explained—Pain salutary, as shown by the late Dr. Marshall Hall's theory of reflex action—Atonic form of the disease—Fatty degeneration of the muscular system, especially of the heart—The gouty do not die of gout, but from diseases resulting from organic changes from constant circulation of impure blood—Case of retrocedent gout.

MOST authors, following the example of Cullen, have divided gout into the regular, the atonic, the misplaced, and the retrocedent. This is "gilding refined gold;" for all practical purposes the division into the regular and atonic is sufficient, as the misplaced and retrocedent may occur in either the regular or atonic form of the disease. The premonitory symptoms which precede the first two or three attacks of regular gout are not, generally speaking, of so marked and decided a character as they subsequently become when the powers of the constitution have become impaired by repeated visitations of the malady. That robust and plethoric appearance which generally distinguishes the gouty before the first attacks of the disease is not a

healthy condition; it may impose on those who are ignorant in these matters, and on none more frequently than those who are its victims, who fancy that so long as they can eat and drink and carry on all the functions and perform all the duties of life, they are in health. But the educated eye and mind of the physician sees in this apparently robust health an excess of supply over waste which must either be checked or relieved, or lead to the excessive accumulation in the circulation of effete materials which ought to be thrown off, and which, by their retention and accumulation, must be productive of disease. It is this delusive appearance of vigour which has led to the generally-prevailing opinion that the first attacks of gout occur in the midst of health. We have to remember that the first visitations of the disease generally take place between thirty and fifty years of age—at a time when men are following the pursuits of business or pleasure with the greatest zest, and when they are the least prone to yield to imaginary evils. It not unfrequently happens, however, that the physician is consulted in this premonitory state, not perhaps so much on account of any pain or ailment as from a sense of some impending mischief or feeling of hypochondriacism; and we generally find in such cases that

the patient has increased largely in bulk; because the hydro-carbonaceous elements of his food have not been burnt off during that accelerated respiration which takes place under strong exercise, but have been deposited in the form of fat in the interstices between his muscles, and have led to that roundness and fulness of form which we meet with in the overfed and underworked man. The same inactivity which has led to the deposition of the hydro-carburets has diminished muscular development: we find that the muscles have diminished in bulk, partly from want of exercise and partly from the nitrogenous elements of the food not having undergone that perfect elaboration which adapts them to become part of the living frame. We observe that his complexion though florid is turgid, his lips livid, his tongue foul and coated with a thick creamy fur, and his breath offensive, frequently from the retention of alcohol in the circulation. He complains of loss of appetite and relish for his food; but although the desire for food is diminished, there is a constant feeling of exhaustion and sinking if he does not take it; he eats and drinks largely to stave off this feeling; and although it is dispelled for the time, it is only to be replaced by a sense of distension, accompanied by flatulence and a disagreeable *après goût*

of whatever he has eaten, to be again followed by that sinking feeling of exhaustion long before it should take place if he were making healthy blood from his food whereby to stimulate the nervous centres to a healthy degree of excitement. He complains very frequently of pain and fulness in the right hypochondrium, with an uneasy shooting pain extending through to the left shoulder-blade. On examination we very generally can trace the outline of the enlarged and congested liver extending into the epigastric and sometimes into the left hypochondriac regions; he is low-spirited and desponding, sometimes on account of grievances which really exist, more frequently from purely imaginary ones; for the retained bile is acting on the nervous system, and producing headache and that depression which makes him view everything through a jaundiced medium, and which sometimes amounts to decided hypochondriasis. The evacuations from the bowels are scanty, deficient in bile, and unnaturally fœtid; the urine highly acid, deficient in quantity, and loaded with lithates. He expresses himself as unequal to any exertion, partly on account of the general inertia and languor which he feels, and partly because it is attended with dyspnœa, palpitation, and a sense of fulness and oppres-

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sion at the chest. This is not to be wondered at, as the heart has participated with the rest of the muscular system in the want of healthy nutrition; and owing to that deficient exhalation of the watery portion of the blood from the lungs and skin which takes place under a sedentary life, the bulk of the circulating fluid has largely increased and has become, owing to the carbonaceous impurities with which it is loaded, less stimulating to the lining membrane of the heart as well as to the nervous system. We thus see that while the propelling power of the heart is diminished, it is called on to do more work. So long as nothing occurs to excite the patient, the pulse is full but slow, and very compressible; the skin is dry and harsh. He is frequently tormented, especially towards night, with great irritation of the fundament; this sensation will generally be found to be the precursor of piles; he sometimes complains of a sense of weight and fulness about the region of the kidneys, and with pain and irritation extending down the ureters to the bladder, which is caused by the passage of rhombic or pisiform concretions of lithic acid with which the urine is loaded. He sometimes seeks medical aid for the relief of one or more of these ailments, but he more generally takes upon himself to tell his medical

adviser that it is "all stomach," and that he wants a course of tonics; that he is unable to lay up, for he has some heavy business coming on which must be attended to. It is unnecessary for me to add, that it is the duty of the physician to point out that tonics, in the existing state of things, would only be adding fuel to the fire; that although they might stave off for a short time, and even that is doubtful, the approaching conflagration, they would only lead to an increase of the combustible materials, and cause them to burn the more fiercely when ignition did take place. It is his duty to point out that the mischief that already exists arises from excess of food and deficiency of exercise; that his stomach, which is a kind of corporeal conscience, cries, "hold, enough," and indicates by the total want of appetite, flatulence, and other dyspeptic symptoms, that comparative rest and a lighter diet is required; while his sallow countenance, his offensive breath, and the condition of the urine surcharged with lithates, indicate that before tonics can be taken with advantage the blood must be depurated by such remedies as will free it from the nitro-carbonaceous impurities with which it is loaded. If he is a sensible man, he follows the advice given, and reaps the benefit in improved health and renewed vigour; more frequently it is only

followed for a day or two, in an imperfect and irregular manner. The degree of depression which exists during the first few days the supply of stimulating nutriment is diminished, and before the blood has been perfectly freed from impurities, is insupportable to him. More obsequious or less well-informed advisers are sought, whom he persuades to support his failing stomach with dinner pills, tonics, &c.; at last they lose their power, and he illustrates in a remarkable manner the beautiful lines of Shakespeare on the fickleness of Fortune, when he says :—


“ She either gives a stomach and no food—  
Such are the poor, in health ;—or else a feast,  
And takes away the stomach,—such are the rich,  
That have abundance and enjoy it not.”

The pages of Ude, Soyer, and other gastronomic authorities, are now ransacked for fresh provocatives to the failing appetite; stimulating drinks, wine, brandy-and-water, &c., are taken in large quantities to remove the depression under which he labours, and to maintain that power which he finds his ill-assimilated food no longer affords. Each day that this course is pursued adds to the plethora of the vascular system and increases the impurity of the blood, until at last a degree of plethora is

induced, under which the kidneys, participating in the general vascular congestion, become unable to eliminate the excess of urates, a portion of the urea escapes on account of its greater solubility, while that which is retained, meeting with large quantities of carbonaceous impurities, becomes reconverted into uric acid; the retained uric acid unites with the soda of the tribasic phosphate of soda of the blood, and on which its alkalinity depends, and forms in its place an acid urate, while the phosphoric acid which is set free, combines with a portion of the undecomposed phosphate, and forms an acid superphosphate; hence the acid condition of all the secretions. We have seen that in rheumatism, where the blood was previously in a high state of vital purity, that the urate of soda thus generated acts as a very powerful animal irritant by rendering the blood so stimulating that the heart and arteries become under its influence excited to contract with great force and frequency, and the process of oxidation is carried on in both the pulmonic and systemic capillaries with the greatest rapidity; but here in the gouty we have a very different condition of the blood: it is loaded with carbonaceous impurities, the *débris* of retained bile and alcohol, to say nothing of those carbonaceous impurities which should

have been thrown off from the lungs and skin, but which, owing to the feeble manner in which circulation and respiration have been carried on, are still retained. Added to this, uric acid, urates and urea, though largely generated for some time past, have been only imperfectly eliminated, owing to the congested state of the kidneys, which has arisen not merely from the general plethora of the vascular system, but from their having been called on for some time past to atone by the increased elimination of uric acid and urates for the impaired depurating power of the other great decarbonizing emunctories—the skin, the lungs, and the liver. They have had to do the work of these organs as well as their own, and have for a time succeeded, but now a degree of general vascular plethora has been induced, under which the Malpighian tufts—the water-secreting portion of the kidneys—are alone able to act and to carry off the most soluble of the urinary elements, viz.: urea. That portion of urea that is retained in the circulation probably becomes reconverted into uric acid, and together with the retained uric acid which has never undergone the process of oxidation into urea, unites with the soda of the blood and forms the urate of soda; and although this salt is incapable of getting up that high vascular excitement

which exists in rheumatism, owing to the different character of the blood on which it has to act, still it does get up a degree of excitement, for we find that for a few hours before an attack of gout, the gouty man loses that depression of spirits under which he has laboured. The urate of soda acts as an irritant, and renders the blood more stimulating to the nervous centres, which have for some time been oppressed with the mass of impure blood. Our quondam patient, who was convinced that tonics were the proper things, now rallies, as it were, for a time, congratulates himself on his superior sagacity, and votes his doctor anything but a man of genius. His spirits improve; his conversation becomes once more vivacious and brilliant, and so long as everything is *couleur de rose*, he again gives utterance to "those flashes of merriment which were wont to set the table in a roar;" but if anything occurs to disturb "the even tenour of his ways," he evinces an irritability and petulance that is evidently morbid and childlike. His appetite not only improves, but becomes very frequently voracious, and he swallows hecatombs of flesh and flagons of wine, to an extent that excite the astonishment of the ignorant and the fears of the initiated, who know that all the great emunctories are locked up, the



bowels constipated, the kidneys congested, and the lungs and skin acting only imperfectly; and yet, while the powers of the heart remain unimpaired, no great mischief occurs, except that he is hourly increasing the quantity and impurity of the blood, and inducing that condition of the circulation under which the mechanism of life must become clogged, and that retarded state of the circulation ensue which is most favourable to the deposition of the urate of soda. When this overloaded and oppressed state of the circulation has reached that culminating point in which the heart is unable to propel the mass of circulating fluid with the requisite vigour, our sagacious friend who would take tonics is at last caught napping, for the attack generally comes on between two and four o'clock in the morning, during the sound and heavy sleep which follows some prolonged and excessive mental effort, or after a heavy debauch. During sleep circulation and respiration are to a great extent carried on by the nerves of organic life alone, and the carbonaceous elements of the blood are not so perfectly eliminated as during our waking hours. Under this increased impurity of blood and diminished nervous power the heart propels the blood but feebly to the extremities, and a few particles of the urate of soda with which it

is surcharged, following the law which universally prevails in lithiasis, become deposited in those fibrous structures in which the circulation is the most feeble. The point at which the circulation is the most feeble is generally in the capillary vessels supplying the fibrous structures of the great toe or the thumb, because at that point the propelling power of the heart is at its minimum, and the resisting force which is offered by the whole column of venous blood is at its maximum. The resistance opposed by the whole column of venous blood is further increased in the lower extremity by the fact of the enlarged and congested liver pressing on the ascending caval vein through which all the blood that circulates in the lower extremity has to pass, and thus impeding its return to the heart. Under this loaded and impeded circulation a few particles of the urate of soda with which the blood is saturated become deposited in the dense fibrous structures about the great toe. The same cumulative tendency in this salt exists here that we find in rheumatism and the formation of calculi, and which is indeed a law of crystallization; each crystal serves as a nucleus for another, provided that stagnant state of the circulation exists that is favourable to their aggregation. After a

time, when the accumulation of the urate of soda has reached a certain point, and the dense and unyielding structures which surround the joint and in which it is deposited are put upon the stretch, the patient awakes in the most intense agony. On inspecting the part it is found tense and shining, but not swollen. The pain goes on increasing for some time as the morbid matter increases, and at last, when it has existed for several hours, and reached that climax when it seems no longer possible to endure it, the pain appears suddenly to subside, for the patient no longer complains, and sinks exhausted into a sound sleep, from which he awakes refreshed and relieved, though not free from pain, and in a gentle perspiration. On re-examining the part, it will generally be found considerably swollen, and varying in colour from a mere erythematous blush to that dark-purple hue that arises from extravasated blood. What has taken place I apprehend to be this: when the urates have accumulated in and around the fibrous structures to an extent that produces the most intense pain by putting the dense and unyielding structures in which they are deposited on the stretch, and when by these depositions the normal circulation through the part has become entirely obstructed, the anastomosing

vessels become enlarged, and an attempt is made to establish collateral circulation; if before the anastomosing vessels can accommodate themselves to carry on the obstructed circulation, the vessels leading directly to the part become so obstructed by the deposition of urate of soda that circulation is entirely impeded, they must relieve themselves either by effusion or rupture. Where the swelling and discoloration is slight, probably serous effusion has given relief until some degree of collateral circulation has been established. When the swelling and discoloration is greater, it is probable that some vessel or vessels carrying red blood have given way, and blood been extravasated into the surrounding cellular tissue. The simultaneous cessation of the pain with the occurrence of effusion or extravasation favours the correctness of this assumption. The relief from pain which is experienced on first waking from sleep generally continues throughout the day; but as night comes on the pain returns and increases for some hours, till the unfortunate patient, worn out by pain, again sinks exhausted into sleep. The reason why relief is experienced during the early part of the day depends, I apprehend, on the fact of the nervous power being increased by sleep—"Nature's soft nurse;" and with that

increased nervous power we find the heart acting more energetically, and no increase takes place in the morbid matter deposited in the part, because there is a degree of vigour in the circulation which is opposed to and inconsistent with their deposition; but as the nervous powers become exhausted towards night, the circulation flags, and the urates, under this feeble circulation in the extremities, become again deposited, and again give rise to one of these painful paroxysms. This is continued for several days. The severity of each of these paroxysms, and the number of times they are repeated, depends on a variety of circumstances; sometimes only one foot is attacked, sometimes both together, sometimes both in succession. If left to run its own course it may last from four or five days to two or three weeks. Under proper medical treatment a week will generally be sufficient to effect a cure in this, the regular healthy form of the disease, providing the patient is submissive—which he generally is—during the paroxysm. Indeed, nothing is easier than to relieve an attack of gout in its well-developed and healthy form. Patients are generally willing to do anything while the pain of the disease exists or is fresh in their recollection, and good resolutions are formed

for the maintenance of future health, but seldom kept.

The remedial measures we adopt, and the self-restraint the patient is compelled to maintain, soon relieve the overloaded state of the circulation. That portion of the urates which have been deposited around the joints are in the first attacks to a great extent thrown off; during the subsequent irritation and desquamation that ensue after the first attacks we should endeavour by remedial measures to effect their removal as completely as possible; inasmuch as they form nuclei or points of attraction for the morbid matter during the subsequent paroxysms, should any take place, and, by their gradual increase, constitute the chalk-stones which disfigure and interfere with the action of the joints around which they are deposited. Convalescence is generally rapid, for, owing to the relief our treatment and the patient's abstinence give in diminishing the quantity of circulating fluid, and the amount of insoluble urates that it contains, the congested state of the kidneys is removed, and they resume their functions; the quantity of urine increases, and lithates and superphosphates become again deposited in large quantities in the urine, and cease to be deposited in the joints; for our remedial measures have dimi-

nished the impurity of the blood, by which it has become more stimulating to the heart, and enabled it to contract with greater energy, while they have at the same time diminished the bulk of circulating fluid which it has to propel throughout the system. Under this increased purity and diminished volume of blood a more rapid circulation is maintained, which is less favourable both to the formation and deposition of urates; and as the kidneys have, under this altered state of affairs, resumed their action, and the patient has abandoned, at all events for a time, his bad habits, the blood becomes purified, and the gouty man expresses himself better in health, and more equal to the duties of life, than he has done for months. Hence has arisen the popular and erroneous opinion, that "gout is the only cure for the gout." This saying originated with the celebrated Dr. Mead, and is, as I shall endeavour to prove when we take into consideration the preventability of gout, as dangerous as it is delusive. The limited knowledge of some of the older physicians as to the true nature of the malady, and the inefficiency of the remedial measures they adopted in relieving it, has led to many erroneous impressions, which have taken a deep hold on the popular mind, and which it is extremely difficult to eradicate. One of these

sayings, however, which also originated with Dr. Mead, contains a great deal of truth. He condemns the use of purgatives for the relief of pain, on the principle that "Nature only makes use of pain as an instrument, and the sharper it is the more speedily and safely she finishes her work." With regard to the question of the efficacy of purgatives, this is not the place to discuss that point; I shall therefore content myself for the present by saying that colchicum was not known in those days. It has remained, however, for modern science to show, by means of the late Dr. Marshall Hall's beautiful discovery of the reflex action of the nervous system, in what way pain is salutary. When the particles of urate of soda are deposited in the fibrous structures of the extremities, it is because that quiescent and stagnant state of the circulation there exists, owing to the general plethora of the vascular system, that is most favourable to their deposition. When a certain quantity of the morbid matter has become deposited in any one spot, it creates, by the distension of the dense and inelastic structures in which it accumulates, great irritation and pain. This irritation is conveyed by means of the nerves of sensation, which are extremely abundant in the neighbourhood of the smaller joints, to the posterior or sensor columns of the

spinal cord, and are reflected from them to the anterior or motor columns, from which the motor nerves which supply the heart are derived. The irritation thus conveyed by sensitive or incident nerves to the spinal cord becomes transmitted by the motor or reflex nerves to the heart; the heart thus becomes roused to more energetic contractions, and the propulsion of the morbid matter to the extremities is insured. If it were not for this salutary irritation, thus conveyed to the heart, and by means of which its action is maintained, it would frequently happen that the impaired and debilitated organ which has participated in the imperfect nutrition of the muscular system would be unequal to the office of propelling the blood to the extremities, for we have to remember that the bulk of the circulating fluid is increased and its properties impaired, and that stagnant state of the circulation would ensue, under which the urates would be deposited in some of the fibrous tissues nearer the heart. This frequently does occur; for, although metastasis is of very much less frequent occurrence in gout than rheumatism, we often see it; and it is always, except when we produce it intentionally, from some distal organ to one nearer the centre of circulation. The application of cold to the gouty toe acts as a direct sedative to the

nervous system through the medium of the nerves of sensation, the irritation of the gouty matter ceases to be felt, the action of the heart flags, and the gouty matter is deposited in the coats of the stomach, the membranes of the brain, or perhaps in the pericardium, or the valves of the heart. Bleeding, hard purging, the too sudden and complete deprivation of all the accustomed stimulants, anything in fact, which acts as a direct sedative while the vascular system is loaded with an excess of impure blood, will produce this metastasis. We see another instance of it in the atonic form of the disease, where the smaller joints have such large accumulations of lithates about them, that they have gradually lost their sensibility,—the pain is not nearly so severe, the irritation is not propagated through the medium of the nervous system, and owing to the impure and unstimulating character of the blood, the contractions of the heart are less energetic, and gouty matter is deposited in all the larger joints; and although the patient does not have a severe and raging paroxysm, he is never perfectly free: there is not vigour enough to develope a good healthy attack. The first attacks of gout generally occur towards the end of winter, for the gouty are very sensitive of the effects of cold, and during the winter months

they take less exercise and live more freely, and the circulation is not relieved by perspiration as it is during the warmth of summer. Men who have suffered from one attack of gout are generally anxious respecting their future liability to the malady, and it may be some comfort to them to know that many never have a return of it; but this generally happens in those only, who have sufficient self-control to abandon those habits of self-indulgence which have led to the development of the disease. More commonly, under a continuance of the habits which first induced the disease, it returns at first once a year, and, as the powers become impaired by excess, its visits take place half-yearly, then quarterly, and as the constitution becomes more broken down, it is scarcely ever absent for any length of time, except a few months in the summer.

The atonic form of the disease may exist from the commencement, but it is not common. It is only met with in those persons in whom a very strong hereditary tendency exists, combined with feeble power, and whose habits of life, from infancy upwards, owing to excess of misdirected care and deficient knowledge on the part of their parents, have been precisely such as were most calculated to develop the disease at an early period of their career. Such

persons are quite incapacitated from following those habits of self-indulgence which are so common with the subjects of gout. The mischief is generally done before they reach manhood; and although they indulge in no excesses, and are necessarily very temperate and prudent in their habits, they suffer from dyspepsia in its most aggravated forms. The reducing and converting power of the stomach appears to be lost; heartburn and flatulence appear on every slight error, or excess in diet; the bowels are almost always constipated, and require the use of purgatives to obtain any action at all. There is great inability to bear any physical exertion; and even moderate exercise, if carried the least degree beyond the powers of the patient, is attended with palpitation, and cold, clammy perspirations, instead of the glow which takes place in the healthy; the urine is almost constantly loaded with urates; regular paroxysms of the disease don't take place, but he has flying pains all over him, gout in every joint; and although no regular paroxysm takes place, gouty concretion occurs, and the lithates are deposited in the large as well as the small joints. At five-and-twenty his step has lost the vigour and elasticity of youth; at thirty he shuffles along with a stick rather than walks; at thirty-five he

has given up walking altogether, and is reduced to hobbling on crutches. Combined with these physical infirmities, the mind is irritable and peevish. Melancholy and dismal views are taken of the existing state of things, and gloomy forebodings are indulged in with regard to the future. The more common form in which we see atonic gout is where repeated attacks have enfeebled the constitutional powers of men not originally strong. The digestive organs become weakened by the excesses which induce each attack of the malady. As time rolls on, and the nervous powers become impaired by advancing years, that excess which was at first an indulgence becomes a habit, and almost a necessity. The reducing and assimilating powers of the stomach become diminished, the delicate capillary circulation of the liver becomes enfeebled, that congested state which was formerly induced only after great and repeated excesses is now easily brought on, and, in point of fact, is seldom absent; and that imperfectly-elaborated state of the chyle almost constantly exists which we have seen to be so unfit for the formation of pure and healthy blood, and which, from its redundancy and from the large quantity of urates resulting from its partial oxidation, leads to the constant formation of an excess of these salts,

which the congested kidneys are unable to eliminate, and which, under the feeble circulation resulting from the action of impure blood on the debilitated heart, become deposited in the larger joints, and ultimately produce organic changes in some of the great vessels or organs whose unimpaired action is essential to life. Many complications, however, which assume a great variety of forms, are constantly found before we arrive at these last results. One of the most common circumstances is for attacks of nephralgia calculosa to alternate with gout. There is in these cases very frequently not only great disinclination to exertion, but there is absolute inability to take it, not merely from the larger joints being implicated, and morbid deposits interfering with active exertion, but fatty degeneration of the muscular tissue has taken place, under which not only are the muscles less sensitive to the stimulating influence of the blood—even if it were healthy, which it is not—but the contractile power of the muscles has diminished from the introduction into their structure of a less highly-organized substance; and which, in a state of health and vigour, ought not to exist at all. Men whose muscles are in this state cannot bear much exertion; but when they are fatigued they can rest their muscles;

but for the heart there is no rest, it must keep on, although its structure is impaired, and it has a larger quantity of impure blood to propel. Can it be a matter of surprise, under these circumstances, that its contractions are enfeebled, and that the morbid matter is deposited in the larger joints and other structures nearer the heart than the extremities. It will be asked, how is it that with these very serious organic changes so few men, as shown by the tables of the Registrar-General, die from gout? To which it may be replied, that the gouty do not die from gout so much as they die from diseases which are the result of the organic changes induced by gout. The structural changes which take place in the substance of the heart itself, in the valves of the heart, and in the coats of the large vessels, as also in the membranes of the brain and spinal cord, as well as in the vessels of the brain, occasion apoplexy, paralysis, dropsy, &c. These deaths are classified by the Registrar-General under the name of the disease from which the individual absolutely dies, but the continued circulation of that impure blood which we have seen to exist in the gouty, causes those organic changes which produce apoplexy, paralysis, dropsy, and death; and although the public do not attach much

importance to gout as a disease which is likely to be attended with a fatal result, still, insurance offices, with whom vital statistics are a matter of figures and not a question of opinion, make it a leading feature in their inquiries of all applicants for insurance. Their medical officers, among whom are some of the most astute men in the profession, not only fear the organic mischief resulting from the disease, but they fear the intemperate habits to which the disease in many instances owes its origin, and which they know from experience are so seldom relinquished. That form of the disease which is known as retrocedent gout is only another name for metastatic gout, and occurs where a regular attack of the disease has suddenly receded from the extremities to some internal organ, and is, as I have before stated, generally attributable to some depressing influence acting primarily on the nervous system, and secondarily, through it, on the heart.

A very remarkable case occurred to me in the year 1848. In the autumn of that year I was consulted by a gentleman who had frequently been my patient on previous occasions, and very generally for the same reason. He was a man of very self-indulgent habits, eating and drinking largely, and taking little or

no exercise; he was then, as he had been previously, suffering from gouty dyspepsia, and was extremely averse to any alteration or modification of his habits of life, and expected that medicine alone was to cure him. He was now clamorous for tonics, and on my pointing out to him that, in his existing state, tonics would be extremely bad treatment, and that although they might enable him to weather the storm a little longer, they would probably bring on an attack of gout, and that it was quite possible that that was the least evil that might occur. He became very angry at this and left me, evidently annoyed at my suggestion, and saying I was quite wrong—there was no such thing as gout in the family. I heard no more of him for a month, when I was summoned to visit him at his place in the country, where I found him suffering from a very severe attack of gout. He was extremely penitent, expressing his regret at having neglected my prognostication, and stating that he was now willing to adopt any measures I might suggest. After prescribing for my patient, and wrapping the affected foot in warm flannels, and placing it in an elevated position, so as to favour the return of venous blood, I sat and conversed with him for some time, for I had agreed, as his place was some distance from

town, to stay with him till the following day, to see the effect of the medicines I had ordered. As I was leaving his room to go down stairs to dinner, he said,—“If you will let me have in a lot of snow (which was then on the ground) to apply to it, it would ease me directly.” I replied, in a jocular manner,—“That it was a very scientific idea, and that he would find one application sufficient.” I had not been in the dining-room more than half-an-hour, when this gentleman’s servant rushed into the room, saying, “Pray come up stairs, sir, for my master is dying.” It may be imagined that I was not long in getting up stairs, where I found my patient as I had left him, in his easy chair, but a death-like pallor had taken the place of his usually florid complexion. At the first glance, it appeared as if respiration had ceased, but my anxiety on this point was soon in some degree relieved by his taking a prolonged, sonorous, snatching inspiration. I can only describe it by saying that it was more like an exaggerated hiccough than anything else I can compare it to; the diaphragm appeared to be drawn down to its utmost limits, and a deep sharp inspiration taken, in the midst of which it appeared to be as suddenly relaxed, and a peculiar forcible-

ble expiration followed; seven or eight seconds appeared to intervene in which respiration seemed to be suspended, and was again followed by another of these spasmodic inspirations; his pulse was about 40, and almost imperceptible.


My attention was of course immediately directed to the affected limb, from which I found the flannels had been taken, and that it was removed from the raised position in which I had left it, and placed in a foot-bath. On dipping my hand into the water, I found it to be perfectly cold. The facts of the case were at once so evident, that fortunately no time had to be lost in making inquiries. To place my patient in the recumbent position—to dry the cold and affected limb—to rub it with hot flannel, while a mustard poultice was being prepared—to apply strong smelling-salts to the nose—and to employ vigorous friction over the region of the heart, was the work of a few minutes; and I had the satisfaction of finding, under this treatment, that the pulse became stronger and more frequent—the peculiar respirations increased in frequency, but gradually lost to some extent their spasmodic character, till at last natural respiration and sensibility were sufficiently restored to enable him to swallow some warm

brandy-and-water, under the stimulus of which, circulation and respiration improved,—the pain returned to the foot, and in the course of an hour's time, had it not been for the occasional return of the peculiar spasmodic inspirations, which took place in a modified degree every four or five minutes, no one would have known the very narrow escape that this patient had just experienced. These spasmodic inspirations continued in a subdued form, but gradually diminishing in frequency and severity for four-and-twenty hours.

As soon as the bustle and excitement occasioned by this attack had subsided sufficiently to enable me to make some inquiries, I found from the valet, that shortly after I had gone down stairs, his master had rung his bell and ordered him to fill his foot-bath with snow, that in compliance with his orders he had done so, and placed it before him; he then left the room, and on returning in the course of twenty minutes he found his master in the state I have described. On conversing with my patient the next day, and asking him what could have induced him to do as he had done, he replied—"that he thought I approved of it when he made the suggestion." How he could possibly suppose that, after enveloping the affected limb in warm

flannels, and placing it in an elevated position, I could wish him to reverse it, and place it in ice-water, was to me incomprehensible. On my asking him if he experienced any pain during this attack, he said, "No; the first sensation was one of great relief from pain in the foot, but that in about ten minutes' time he experienced a burning constriction at the bottom of his chest, as if a red hot wire had been placed round him, and that it was being pulled tighter and tighter, that he then tried to get up to ring the bell, but was unable to do so;" he could remember nothing beyond this. Now what took place in this case? It appears almost impossible for any man to answer with confidence and certainty. My own impression is, that, under the direct sedative action of the snow-water on the sentient extremities of the sensor nerves, the irritation of the gouty matter deposited in the toe not only ceased to be conveyed to the brain and spinal cord, but I believe that the continued application of cold acted as a direct sedative upon the nervous centres, and that under the depressing influence of cold, and the feeble stimulation of impure blood, the heart's action became almost entirely suspended, and was only maintained by the accidental circumstance of a small portion of the morbid matter becoming, under the weakened

circulation, deposited in the central tendon of the diaphragm, and, by the irritation thus set up, sufficient stimulus was conveyed to the nervous system to maintain circulation and respiration in the imperfect manner in which it existed, until the exciting cause was removed, and artificial means adopted to raise the failing powers to a more vigorous and healthy action. This gentleman recovered without any further unusual or untoward symptoms, and promised to lead a new life for the future, but he soon relapsed into his old habits. I subsequently attended him in two attacks of gout, and I need not add that he never had recourse to snow-water again; but his want of self-control continued, and his dyspepsia increased, and was attended with most depressing fits of despondency, in one of which he destroyed himself,



## CHAPTER VI.

Gouty complications—Obstinacy of local injuries in persons of a gouty tendency—Undeveloped gout very common in females—The organic changes which occasion angina pectoris caused by the long-continued circulation of gouty blood—Comparison of the most remarkable symptoms in gout and rheumatism, showing in what respects they most resemble and differ from each other, and why.

WE constantly hear people speak of suppressed or undeveloped gout. The variety of forms which suppressed or undeveloped gout assumes are so multiform, that to attempt to describe them would entail the necessity of showing the influence which the accumulation and retention in the circulation of gouty matter has in complicating, masking, and simulating almost every disease to which the human frame is liable. We generally see these gouty complications in persons who have a strong tendency to the disease, who live freely at intervals, but not continuously, and who, while they take sufficient precautionary measures, both as regards diet and exercise, to prevent that loaded and oppressed state of the circulation in which an attack is inevitable, do not carry their

remedial and precautionary measures to a sufficient extent to lead to complete purification of the blood. The retention of gouty matter in the circulation complicates and exaggerates many local and constitutional maladies, especially those which are caused or kept up by a state of passive congestion of the affected structures. We have seen that it is an invariable law in lithiasis, that the urates are always deposited in those tissues for which they have the greatest affinity, viz., the fibrous; and of these they select those in which the circulation is the most feeble, and this peculiarity often renders the treatment of local injuries, such as sprains, &c., extremely difficult and almost impossible by the ordinary means. A man whose blood is loaded with lithates sprains his ankle, or injures his knee-joint. We leech, blister, foment, rest, bandage, put him up in splints, so as to ensure more perfect rest than we could otherwise obtain, but all to no purpose; we find after weeks, and perhaps months of treatment, that our patient is worse rather than better. The total deprivation of his accustomed exercise, with very frequently no alteration in his diet, leads to a further accumulation of urates, in the midst of which he perhaps has a regular attack of gout, and the local injury then yields to the ordinary remedies.

Every well-informed surgeon is so well aware of these gouty complications, and the frequency with which they keep up and exaggerate local injuries, and of the great benefit derived from antelithic remedies, that in severe and long-standing cases they never fail to inform themselves on these points, and very often gain great credit for the rapid cures which they are enabled to effect from a knowledge of these complications, and their appropriate treatment.

This suppressed or undeveloped form of the malady prevails to a very great extent among females in the upper and middle ranks of life. It is the fashion to say that women do not have the gout. It is unquestionably of rare occurrence in its true and uncomplicated character in females, the greater purity of their lives, the larger quantity of water that exists in their blood, and which thereby affords a menstruum for the solution of the urates, the less amount of fibrin, and the periodical depuration of their blood by means of the catamenia, offer the most probable explanation of this comparative immunity. But although gout seldom occurs, gouty complications are of very frequent occurrence. It has been too much the custom to attribute almost every anomalous and obscure symptom occurring during the maladies to which women

are liable to hysteria; and although there can be no doubt that many obscure and eccentric symptoms are due to those functional affections which we classify under the name of hysteria, still it is equally certain that hysteria offers in many cases too ready a solution of the difficulties, by leading us to attribute to it symptoms which are due to other causes, and thereby does harm by diverting our attention from the true nature of the complication. While, therefore, I admit that hysteria is the true origin of many of the symptoms ascribed to it, I believe that the hysteria itself is very often maintained by that impure state of the blood, which we find in the gouty, in the chlorotic, &c., and which affords such imperfect nutrition to every organ through which it circulates, that it can be no matter of surprise to the physiologist that the functions of the uterus or any other organ are impaired, perverted, or temporarily lost. Some men can see nothing but hysteria in almost all the subacute and chronic ailments of women; and they treat them as if they had no other organ but a uterus; whereas the functional disturbance is in a great measure due either to a deficiency of stimulating properties in the blood or to an excess of impurities, which renders it equally unfit for the purposes of nutrition. We should not have a

very high opinion of a practitioner who, because his patient fainted from the fact of his blood being too unstimulating or too impure to excite the heart to act with sufficient vigour to propel the blood to the brain, adopted what a celebrated sporting writer described as "the good old English practice of punching his head," in order to resuscitate him and rouse the dormant powers of his brain. It is just as unreasonable to stimulate the uterus with alectics, &c.; in many of the supposed cases of hysteria—take, for instance, many of the so-called hysterical affections of the knee-joint which we see in young women—no doubt hysterical symptoms exist; but the impaired uterine actions, the nervous excitability, the dyspepsia, and flatulence arise from the imperfect nutrition of impure blood, just as much as the pain in the loins extending down through the ureters to the bladder depends on irritation from the passage of urates, or as the enlarged and painful joint depends on the deposition of urates in its fibrous structures. We often see these cases attended with considerable enlargement of the joint from effusion into the synovial cavities. The irritation set up by the deposition of morbid matter in the fibrous, extends to the synovial structures, and inflammatory action of a low type

is set up in them, and we get the products of inflammation in the increased effusion within the synovial cavity. These cases are generally of long duration, and metastasis seldom takes place, for there is not vigour enough in the circulation to propel the morbid matter from the spot in which it is first deposited. Many of these cases are nothing but instances of rheumatic gout occurring in persons of feeble power. Dr. Laycock, in his work on the Nervous Diseases of Females, says—"That of the many cases related by authors as anomalous hysteric disease, by far the greater portion were connected with a gouty diathesis, as indicated both by the formation of calculi, by the occurrence of regular paroxysms of gout, and by the descent of the individual from gouty ancestors; they are cases, in fact, which would have been better understood and better treated if they had been termed anomalous gout; but as the subjects are young females, they are of course set down as anomalous hysteria."

I have already stated that gouty complications are so numerous and eccentric in their character that the attempt to describe them would entail the necessity of showing the influence that the gouty diathesis has in modifying and altering almost every disease to which the

human frame is liable. But there is one disease which, in my humble judgment, is so intimately and essentially connected with the gouty diathesis, that I think its true pathology, hitherto involved in considerable obscurity, may be more completely elucidated by showing how the organic changes which occasion the various symptoms are the result of that impure condition of the blood that prevails in gout, that I cannot refrain from devoting a short space to the consideration of the subject. The disease to which I allude is angina pectoris. This disease was for a long time thought to be a neuralgic affection; but, as Dr. Watson observes, this is scarcely consistent with the facts: "First, that the paroxysm is excited by such causes as are especially calculated to disturb the natural action of the heart—bodily exertion and mental emotion; and secondly, that the disease is so very frequently and suddenly fatal." Dr. Jenner and Dr. Parry found that the coronary arteries in some of those who died of angina, were ossified, and they assumed, that when the heart was called on to make increased exertion, the ossified arteries were unable to accommodate themselves to the increased quantity of blood essential for the nutrition of the organ under the additional exertion, and the action

of the heart came to a stand-still. No doubt when ossification of the coronary arteries exists they may, by their diminished calibre and contractility, exercise considerable share in the induction of the symptoms, but *post-mortem* investigations show that ossification of the coronary arteries frequently does not exist at all when death from angina pectoris has been undeniable. Moreover, this condition of the coronary arteries is not unfrequently found after death from other diseases where no symptom of angina pectoris has existed during life. Dr. Forbes collected some statistical information of *post-mortem* examinations of individuals dying from angina, which Dr. Watson has alluded to as follows:—"The total number of cases collected by him (Dr. Forbes) in which the body was examined after death was forty-five. Of this number there was disease found in the liver only in two instances, organic disease of the heart or great vessels in forty-three. Dr. Forbes, indeed, makes the last number thirty-nine instead of forty-three, excluding four cases in which nothing morbid was found in or about the heart, except an excessive coating of fat. This, Dr. Fothergill considers the essence of the disease; and certainly a heart cannot be said to be in a healthy state which is thus loaded

with adipose matter. The fat is generally deposited at the expense of the muscular substance, which is apt to be thin, pale, and soft—atrophied, in short. Taking, however, the table as it is given by Dr. Forbes, the thirty-nine cases in which there was no disease except in the heart and great vessels were thus distributed. In ten of the cases there was organic disease in the heart alone, in three organic disease of the aorta alone. In one instance only was the disease confined to the coronary arteries; but there was ossification or cartilaginous thickening of the coronary arteries combined with other disease in sixteen instances. Again, there was ossification, or other disease of the valves of the heart, in sixteen cases also. There was disease of the aorta, ossification, or dilatation, or both, in twenty-four cases, and in twelve cases there was preternatural softness of the heart." Now, what, I ask, are all these morbid results but precisely those that we might expect to find in individuals in whom nutrition had become impaired from those blood changes which take place in gout. The hydro-carbonaceous impurities existing in excess in the gouty blood are deposited between the muscular fibrillæ of the heart in the shape of fat, taking the place of that fibrin which, from its feeble organization,

is not adapted to the process of reparation, and thus gives rise to that state which we recognise as fatty degeneration; while the excessive formation and imperfect elimination of urates and superphosphates of lime and soda, and their consequent deposition in the fibrous coats of the large vessels in and about the heart, constitute the atheromatous deposits which we see from the *post-mortem* examinations constitute so important a feature in the organic changes which accompany this disease. Under this degenerated structure, we cannot feel surprised that impaired function should arise; we cannot be surprised that that energetic contractility of the heart, and that remarkable elasticity of the great vessels which exists in health, and which enables them to accommodate themselves to the additional demands that are constantly made on them under physical and mental excitement, should cease to exist in that degree of perfection which prevailed in health. So long as the patient keeps on level ground, or does not exert himself much, or is not exposed to mental excitement, the circulation is unembarrassed; but directly the enfeebled and degenerated organ is called on to make more frequent and vigorous contractions from the blood arriving in its cavities in larger quantities; it fails. Instead of being

stimulated to the necessary exertion, it becomes as it were paralysed; the new fatty structures don't feel the stimulus, and the old muscular structures are oppressed by the mass of impure blood, and their inability to propel it onwards; but they do their best, which is but little, for in consequence of the deposition of fatty tissues between their fibrillæ; their contractions are irregular, feeble, and spasmodic; and it is not until the patient becomes perfectly quiescent, and a more healthy balance is re-established between the mass of circulating fluid and the circulating power, that he feels relieved. But not only are the organic changes revealed by the *post-mortem* examinations of those who die of this disease precisely such as we should expect from that impure condition of the blood that exists in the gouty, but the period of life at which the disease takes place, and the very much greater frequency with which it occurs in men than women, must depend on some certain and definite law. In corroboration of this we must again have recourse to Dr. Watson's account of Dr. Forbes' statistical inquiries. In referring to this subject he says:—"Thus, out of eighty-eight cases, eight only, or one in eleven, occurred in females; and of the eighty-four, seventy-two were above

fifty years; and twelve, or one-seventh of the whole, under fifty years. It is a disease, therefore, of advanced life; and this alone would afford a strong presumption of its dependence upon some organic change." But, independent of the organic changes being precisely such as we should expect to occur from the peculiar condition of the blood in the gouty, the age at which the disease occurs, and its greater frequency among men than women, favours the assumption that the organic changes which occasion this disease are dependent on the gouty diathesis.

I am compelled to confess, however, that my opinions as to the organic changes which occasion angina pectoris, were formed before I read the statistical results of Dr. Forbes' inquiries, and were mainly based on the fact, that the only two cases of angina pectoris that I had ever seen occurred in persons in whom the gouty diathesis had been strongly marked for years. One of these patients died suddenly from an attack of angina, the other was carried off by influenza; so that I am unable, as no *post-mortem* examination was allowed in either case, to contribute any reliable information from my own practical knowledge; and I should not have said as much as I already have done on the subject, except

that I think it very desirable that the attention of the profession should be directed to the point, and more extended observations, as to the concurrence of the two maladies, prove either the correctness, or fallacy of these surmises.

Having gone, in the preceding pages, through the most remarkable phenomena that occur in both gout and rheumatism, we may now take a retrospect of the most distinctive features of each, with a view of comparing the points in which they resemble and differ from each other. In the first place, both acknowledge a common starting-point in the hereditary tendency; but this is more remarkable in gout than in rheumatism. Out of 522 gouty persons, of whom Sir Charles Scudamore collected information, 322 could trace the disease from their father, mother, grandfather, grandmother, uncle, or aunt. In the remaining 200, the disease could not be traced to any progenitors. Rheumatism does not acknowledge so strong an adhesion to the hereditary tendency. Out of 246 cases registered by Dr. Fuller as having occurred at St. George's Hospital, the hereditary transmission was traced in 71; in 137 it could not be traced; 15 were uncertain, and 23 unrecorded. We have already seen, that this hereditary tendency means the lithic acid diathesis. The excess of uric acid

and urates in gout is due to an excess of mal-assimilated nitrogenous food, which, owing to defects in the various processes of primary assimilation is not raised to that standard of perfection which fits it to be incorporated into the animal fabric; and which, even if it were, would, in the great majority of cases, not be required: for the sedentary habits of the gouty lead to the absorption of but small quantities of oxygen, the waste of old tissue is therefore slight, and the demand for new material to supply its place very limited. The nitro-carbonaceous elements which, under these circumstances, are constantly being thrown into the circulation in excess, have no alternative, but that of getting out of the circulation again, in which they are not wanted; but before they can do this, they require the aid of oxygen to reduce them to that condition most favourable for elimination. But as under the feeble respiration of a sedentary life the absorption of oxygen by the red globules has been very limited, the process of destructive assimilation is as imperfect as the primary has been, and a large proportion of the albuminous materials with which the blood abounds is only partially oxidized, for there is too much effete and superfluous nutritive matter to be oxidized, and too little oxygen to do it with. The process of oxidation therefore

ceases at uric acid instead of at urea; those blood-changes then take place, which lead to the formation of urates and superphosphates in excess.

In rheumatism, though the excess of uric acid and urates may arise partially from excess of mal-assimilated nitrogenous food, they owe their origin principally to the influence which cold and moisture exercise in depressing the systemic circulation, and thereby suspending the oxidation of tissue when it is only partially completed. Cold and moisture being applied to the surface when the body has been heated, depress the vitality of the fibrous tissues, by rapidly abstracting the heat, and at the same time suspending the oxidation of tissue, and causing it to cease at uric acid instead of urea. Cold and moisture thus generate concurrently, the morbid matter, and that condition of the fibrous tissues most favourable to their deposition. In rheumatism, the urate of soda acts as a powerful animal irritant, owing to the purity of the blood which exists from the more temperate and healthful habits of the patient it renders the blood highly stimulating to the heart and arteries, and a state of vascular excitement takes place. In gout the blood is loaded with carbonaceous impurities, and although the urates may at first get up the semblance of excitement, it is very

feeble, and of short duration. In rheumatism, the urates are deposited in those fibrous tissues which have been exposed in the greatest degree to the sedative influence of the exciting cause, and in which the circulation is consequently the most feeble; and as the larger joints possess a greater amount of the fibro-cartilaginous tissue, they become the special habitat of the morbid matter, and we can thus understand why they are more frequently implicated than the smaller ones.

In gout the morbid matter follows the same law; for if any tendon or ligament has been sprained or injured and its circulation weakened, there the gouty matter is deposited. In the absence of any local injury, it is generally deposited in the small joints of the extremities, where the circulation is most languid; for at that point the propelling power of the heart and arteries exercise their minimum force, while the resisting power of the whole column of venous blood is the greatest. In both affections metastasis takes place, but most frequently in rheumatism. The metastasis of rheumatism arises, partly from reaction taking place in the part itself from irritation set up by the morbid matter, and partly from the vigour with which the circulation is carried on, and under which the morbid matter is forced from

the part where it was originally deposited, into the current of the circulation, to be again deposited in those fibrous tissues, which have been exposed in the next degree, to the depressing influences of the exciting cause. Metastasis is of much less frequent occurrence in gout, and when it does take place, is always—except when we induce it artificially—from the extremities to some organ nearer the centre of circulation. Rheumatism is attended with profuse acid perspiration, for the skin, being a very highly-organized structure, rapidly participates in the high vascular excitement that is set up. In gout the skin is dry; for although there is vascular plethora, the blood is so loaded with carbonaceous impurities that it fails to excite the heart to that vigorous contraction which exists in rheumatism, and the cutaneous circulation becomes very feeble. In rheumatism there is great tolerance of blood-letting, and the blood is highly buffed and cupped, for the process of fibrination is carried to excess. In gout there is great intolerance of blood-letting; the nervous centres are but feebly nourished by the impure blood; the structure of the heart is often enfeebled by fatty degeneration; and the abstraction of blood, even in moderate quantities, would probably be followed by fatal syncope or

metastasis to some internal organ; and the blood drawn, although not containing so perfect a buffy coat, is generally buffed, but not cupped. There is an excess of fibrin, but it is feebly organized, and the clot is large and flabby, thereby indicating a low degree of vitality.

Under judicious treatment the relief obtained in gout from medicine is remarkable, and the convalescence rapid. By relieving the plethora of the vascular system through the portal circulation, and by setting all the great decarbonizing emunctories to work, while we maintain a healthy balance between the amount and nature of the ingesta and the requirements of the system, not only do the urates cease to be generated in excess, but those already existing are eliminated by the restored action of the various emunctories. Purer blood is now formed, and a more healthy condition of the circulation maintained, at least until the patient again resumes those habits which were the original cause of the malady. In rheumatism the complications are much more unavoidable, the duration of the disease much longer, and the convalescence more protracted. We have little or no control over the complications, because they depend on the uncertainty of metastasis and the excessive fibrination of the

blood. The longer duration of the disease and the tediousness of the convalescence depend first on the fact, that under the rapid but imperfect metamorphosis of tissue occasioned by the high vascular excitement, the morbid matter is constantly being generated *de novo*, and is unable to escape from the circulation as rapidly as it is formed, for under this high vascular excitement, the kidneys are unable to excrete sufficient water to carry off the large amount of insoluble urates that are constantly being thrown into the circulation; and although the skin is acting with great vigour—and there can be no doubt, that an immense amount of nitrogenous impurities are thus eliminated—still an excess remains and keeps up the phenomena of the disease. In the second place we have to remember, that the very cause which made the fibrous structures so sensitive to the depressing influence of cold, namely, their feeble organization, renders them equally slow in recovering that vitality and vigour which has been lost, and the question naturally suggests itself, whether the pain and irritation set up in the debilitated fibrous structures by the retention of the morbid matter, is not a conservative effort of nature, for rousing these enfeebled and debilitated tissues to their normal and healthy action?

## CHAPTER VII.

Treatment of gout—General observations—Bleeding—Purgatives—Colchicum; its *modus operandi*—Ill effects of colchicum; how induced; the best mode of administering it—Vegetable salts of potass—Vapour baths and hot air bath—Pure air promotes recovery—Inhalation of an atmosphere largely surcharged with oxygen — Diet — Local treatment — Convalescence—Remedies during.

DURING the earlier periods of a medical man's career he has but few opportunities of becoming practically acquainted with the phenomena of gout, and observing the effects of the various remedial measures that are usually adopted for their alleviation. In private life, those who suffer from this malady are unwilling to trust themselves to the inexperienced tyro, and hospital practice but rarely affords opportunities of studying the disease at the bed-side. The junior members of the profession are thus compelled to receive and act upon the traditional experience of their predecessors; at all events for the first few years of their professional life. The practice of but few men affords extensive opportunities of studying the disease upon a large scale.

The practically busy men are scared at the entanglement and mystery in which the phenomena that constitute the disease are involved, and are content to receive and act upon the experience of others; while those who have had but few opportunities of observing the disease consider themselves practically incompetent to investigate and elucidate its eccentricities. The treatment of gout has, therefore, from comparative ignorance of its true nature, maintained that system of inert expectancy which was advocated by Sydenham; even colchicum, the most valuable and efficacious remedy we have, when properly administered, which it very frequently is not, from the ignorance which exists of its true *modus operandi*, has fallen in some degree into disrepute, and is not unfrequently accused of aggravating the ills it is intended to alleviate. That very serious evils result from the excessive administration of this remedy, I am not prepared to deny, but it is from the abuse, and not the use of colchicum, that these untoward events occur. Men ignorant of the true nature of the malady, and of the action of the remedy they use, give large doses with the view of knocking down the disease, but they too often only knock down their patient instead. We shall presently, when we take into consideration

the action of colchicum, enter more fully into the evils resulting from its excessive and improper use. The treatment of gout naturally divides itself, into that which is adopted for the relief of a paroxysm and that which is directed to the eradication of the gouty diathesis. While it will be seen from the preceding pages, that modern investigations have proved the correctness of many of Sydenham's assumptions, as to the true nature of gout, it will be also seen from the succeeding ones, that modern therapeutics have rendered some of the means he considered useless, available for the relief of this disease. Sydenham says, in his admirable treatise,—“Nature seems to have the prerogative to expel the peccant matter according to its own method, and throw it off upon the joints, there to be carried off by insensible perspiration. Now there are only three ways proposed of expelling the morbid matter of gout—namely, bleeding, purging, and sweating; but none of these will ever answer the end.”

Bleeding, purging, and sweating, as practised in those days, were probably found very inefficient remedies; a more modified application of these remedies, based upon a sounder knowledge of their effects, when less vigorously used and more judiciously combined with other means

which modern medicine adopts, proves that these remedial measures are far from being useless. In Sydenham's time, they were either carried too far, and thus did mischief, and consequently fell into disrepute, or they were too exclusively relied on; and, by their injudicious combination, and more being expected from them than they are by themselves capable of effecting, they failed to acquire that well-deserved reputation, which, under their judicious application by a physician thoroughly conversant with the malady he treats, and the therapeutic influence of the remedies he uses, they are fully entitled to. Every medical practitioner who has had opportunities of observing the asthenic character of gout will at once deprecate the abstraction of blood by venesection, especially if resorted to, with the impression that we have an inflammatory affection to subdue, and the quantity of blood drawn was to be regulated by that idea. No one could have entered on the practice of the profession with more decided views on this point than I did; for a very strong impression was made on my mind some years ago by the emphatic words of one of the most popular and able teachers of medicine this country has ever produced. Many of my professional readers will be at no loss to recognise the talented gentleman to whom I

allude, when I repeat the words which he was in the habit of addressing to his class on the impropriety of bleeding in gout. "Remember, gentlemen, you don't bleed in gout, the disease does not demand it, and the constitution won't bear it."

The impression made on my mind by these few words has been in no degree diminished by the subsequent opportunities which I have possessed of observing the asthenic character of the disease. It is true there is great vascular plethora; it is true there is at the commencement of an attack, so well simulated a semblance of inflammatory symptoms that we should feel tempted to adopt antiphlogistic measures, were it not, that we know from practical experience that if we were to bleed to the extent we usually do to subdue inflammation, we should bring our patient to a degree of prostration in which either metastasis to some internal organ would take place, or prolonged and perhaps fatal syncope. But to be forewarned is to be forearmed. On a more careful examination we find, although there is some fulness of pulse, it is exceedingly compressible, although there is some heat of skin, we find it dry; there is a degree of atony in the capillary circulation, under which the vessels which should carry off this heat in

the shape of insensible perspiration, fail to do so. We know that the heart and whole vascular system is clogged with the mass of impure blood with which it is loaded, and that the nervous system is oppressed and congested, and but feebly stimulated by this impure blood; we therefore know from the practical observation of ourselves and others, while we see from consideration of the true nature of the malady, that bleeding wont do, if practised in the heroic manner of the older physicians,—*pleno rivo, amplo orificio*; but there is as great a difference between the effect of blood-letting, when practised in this cow-doctoring fashion, and the abstraction of from two to four ounces of blood, as there is between the five minim doses of tinct. opii which we administer to promote capillary stimulation, and the full two grain doses which we give to maintain the direct sedative effect of the copious abstraction of blood. Our object in bleeding is not to subdue inflammation, but to relieve that oppressed state of the circulation under which all the great vital functions are so feebly performed. We should therefore, if we think the case is one in which a small quantity of blood may be abstracted from the arm with advantage, be careful to puncture the vein but slightly, so that the blood may flow slowly from

a small orifice, our object being to diminish the amount of circulating fluid with the least possible sedative effect on the nervous centres. When the circulation is relieved in this way, the contractile power of the heart becomes more adequate to the work it has to do, the contractions of the organ become stronger, the blood is sent with greater force to both the capillaries of the lungs and skin, the decarbonizing functions are carried on more perfectly in each of these great depurating organs, with each pulsation the blood becomes purer and more adapted to stimulate the enfeebled heart to that vigorous contraction, under which, the lithates cease not only to be deposited, but to be generated. Bleeding, therefore, when practised in this manner, acts indirectly as a stimulant by establishing a more healthy balance between the propelling power of the heart and the quantity of blood to be propelled through the system. This more vigorous circulation also leads to the more complete purification of the blood, and the more perfect fulfilment of the various excretory processes. It seems almost superfluous to add, that where any tendency to that wretched disease, delirium tremens, exists, even there small bleedings must be avoided. If we have any doubt as to the propriety of taking blood from the arm in

these small quantities, we should give the patient the benefit of the doubt, and content ourselves by the application of from four to six leeches to the hæmorrhoidal veins. Dr. Gairdner was the first physician, I believe, to whom we are indebted for pointing out the great advantages that accrue to the patient from bleeding in gout in these small quantities. I was at first sceptical as to its success, but subsequent experience compels me to admit, that if due care is exercised in the selection of the cases, taking only those in whom there is a good deal of *vis vitæ* still unimpaired from repeated attacks, or from habits of intoxication, we may employ this remedy with the greatest advantage to our patient and credit to ourselves; due precaution being always maintained to draw the blood slowly, which is ensured by making a small puncture. After all, bleeding is not a necessity, and although it is a valuable and efficient auxiliary in the treatment, we should never have recourse to it, except we are certain that the powers of life are sufficiently unimpaired to permit our doing so without depression of the circulation being occasioned by the abstraction of even this small quantity. Almost as much difference of opinion has existed among physicians, with regard to the propriety of administering purgatives, as has pre-

vailed with respect to other remedial measures. We find great names on either side, each advocating the use or uselessness of purgatives, according to their own individual experience or preconceived ideas, as to the nature of the malady. It is the old story of the chameleon; both sides are to a certain extent right and both wrong. The older physicians had a theory, that it was nature's prerogative to expel the peccant matters in her own fashion. The moderns, who object to purgatives, say, and very justly too, that hard purging is open to the same objection as bleeding, and that by enfeebling the powers of the patient we incur the risk of metastasis. The pale, scanty, and foetid evacuations from the bowels, if no other reason existed, would indicate the necessity of purgatives; but purgatives, *per se*, only disappoint us, and do the patient no good. If we give saline purgatives, they only produce watery evacuations without clearing out the mass of fœcal matter, and without any improvement in the secretions or benefit to the disease. If we give the warmer purgatives, such as rhubarb, scammony, aloes, &c., they only act imperfectly as regards the fecal accumulations, and scarcely at all in relieving the portal congestion. Neither salines nor the warmer aperients are of any use in removing

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that hepatic congestion and retention of bile which is the cause of the constipation. Blue pill, which under ordinary circumstances is successful in restoring the biliary secretion, fails. The over-distended capillaries of the liver disregard the ordinary stimulus. Purgatives, *per se*, are of no use, and we are obliged to have recourse to that great modern remedy, colchicum, which, judiciously combined with the most appropriate purgatives, soon obtains copious but not excessive evacuations from the bowels, and which the same aperients, when previously given uncombined with colchicum, failed to obtain. Pereira says—"For the introduction of colchicum into modern practice we are chiefly indebted to Stork, in 1743; but its application to the treatment of gout first took place about seventy years ago. M. Husson, a military officer in the service of the King of France, discovered, as he informs us, a plant possessed of extraordinary virtues in the cure of various diseases. From this plant he prepared a remedy called Eau Médicinale, which acquired a great celebrity for alleviating the pain and cutting short the paroxysm of gout." The *modus operandi* of colchicum is a problem which has hitherto remained unsolved. The result of investigations in this matter appears to be, that

its curative influence is due to the power which it possesses of increasing the soluble urea and diminishing that of insoluble uric acid and urates. Now these substances, as shown in the earlier part of this work, are vicarious of each other. Whatever diminishes the quantity of uric acid increases the quantity of urea, and *vice versâ*. How, then, does colchicum effect this? certainly not by its chemical action as a solvent of the morbid matter. Sir Everard Home thought, from experiments tried on animals, that it acted through the circulation, but he does not say how. Now, the solution of this question involves something more than the mere gratification of our curiosity, for I believe by it, an insight into the true nature of the malady and the adoption of such measures as are best calculated, not only to relieve the paroxysm, but to prevent their return is to be obtained. The action of colchicum and its curative influence in gout depends, I believe, on the following circumstances. When colchicum is absorbed into the circulation it acts, if given in proper doses, on the over-distended and enfeebled capillaries of the liver, very much as opium acts on the enfeebled vessels of the brain in delirium tremens and other diseases of nervous exhaustion—it stimulates them to new and healthy action,

under which, they recover their contractile power or tone. The secretion and excretion of bile into the duodenum take place, and the bowels resume their healthy action, as evinced by the copious, pea-soupy, bilious evacuations, instead of the scanty, colourless, and foetid stools that before existed. The congestion of the liver diminishes, and with cessation of congestion, a diminution in the bulk of the organ takes place; it ceases to press on the ascending cava, and to prevent the free return of blood from the lower extremities; it ceases to press up the diaphragm and diminish the cavity of the chest, by which the action of the lungs is impeded; but these are the mere mechanical obstacles to that more perfect oxidation of the blood which is the cause of gout. The greatest benefit that results from the action of colchicum by the restoration of the flow of bile through its natural channels is not confined to the mechanical influence that it exerts in diminishing the bulk of the liver, and thereby removing the pressure from the ascending caval vein, or to increasing the cavity of the chest so as to make more room for the play of the lungs, while at the same time the process of chylification is promoted; but this restoration of the bile to its natural channel depurates the blood from the carbonaceous impurities, that are

constantly being carried into it by its retention, the blood becomes more stimulating in its character, and the nervous system, partially freed from carbonaceous impurities, becomes more sensitive to the stimulus of purer blood, the heart becomes excited to more energetic contractions, circulation and respiration are carried on more perfectly, larger quantities of carbonic acid are thrown off with each expiration, larger quantities of oxygen inhaled with each inspiration, from the greater quantity of oxygen absorbed by the red globules, and carried by them to the systemic capillaries, destructive assimilation is more perfectly effected, the insoluble uric acid becomes oxidized into the more soluble urea, while owing to the relief which is afforded to the circulation through the increased exhalation of aqueous fluid which takes place from the lungs and skin under the accelerated and more perfect respiration and perspiration, together with the relief which is afforded to the overloaded circulation by the action of the saline aperients we have combined with the colchicum, that congested state of the vascular system in general, and of the kidneys in particular, which previously existed, is diminished; they resume their functions, and uric acid, urates, and urea are again carried off by the kidneys and appear

in the urine (instead of being deposited in the extremities,) till the circulation becomes freed from an excess of these impurities, and the blood restored to its normal and healthy state. We thus see how colchicum, by its action primarily on the liver, and secondarily, by restoring the functions of all the great decarbonizing organs, leads to a diminution of uric acid and urates, and an increase of urea, and thus attains, at one and the same time, the ultimate object of all medicine, and the highest duty of the physician, by putting Nature into a position to effect her own cure. I have already stated that colchicum not unfrequently aggravates the ills it is intended to relieve. It will be asked how? By being given in too large doses. Men, over zealous and anxious to relieve their patients, and ignorant of the action of colchicum in large doses, are sometimes tempted, with the view of subduing the disease more rapidly, to give colchicum in larger doses than they would otherwise do; but, unfortunately for their patients and themselves, it is the very worst practice they could adopt, for when given in large doses it very frequently produces excessive vomiting and purging, succeeded by great prostration. Dr. Lewins relates a case in which a dose of seventy drops of colchicum caused the

discharge of upwards of a pint of bile by vomiting. It over-stimulates the capillaries of the stomach and liver; but the state of stimulation is of short duration, and is succeeded by a more permanent state of depression, the over-stimulated capillaries are left in a more feeble and atonic state than ever, and we are compelled to abandon the use of this valuable remedy for some time, for although under ordinary doses and circumstances there is considerable tolerance of the remedy, when the sedative effect of colchicum has been thus adduced, the stomach appears to be exceedingly retentive of the violence that has been previously offered it, and vomiting and purging re-ensue on the readministration of even moderate doses. In addition to this, the type of the malady becomes altered under the sedative and depressing effects of these large doses, and good genuine gout assumes, under this enfeebled condition of the vital powers, the lingering atonic form of the disease. Another evil resulting from colchicum when properly administered is, that owing to the extreme rapidity of its curative influence, it sometimes lulls men into a false security, and induces them to abandon those habits of self-restraint which are their best safeguard. They know from experience the relief that colchicum has afforded

them during their earlier attacks, and they fancy its influence is to last for ever. It is useless to talk to them of the probability that organic changes will result from this constant circulation of impure blood, or telling them, that although the remedy has relieved the paroxysm, the circulation is not yet purified from the gouty elements, nor the tone of the capillary circulation in the stomach and liver sufficiently re-established to permit the resumption of their old habits of free living. These evils are too distant to influence them; with the resumption of the old habits, the enfeebled capillaries of the liver soon give way again, impure blood again circulates through every tissue in the body. Organic changes at last take place in the heart and large vessels; that general vascular congestion which was at first induced only after long and repeated excesses is now scarcely ever absent, the patient now becomes what is miscalled a martyr to the gout, he forgets the warnings which were at first constantly held out, and not unfrequently attributes, but most unjustly and erroneously, his existing state to colchicum, and to its not having let the disease run its course. Thus, colchicum, which has been the best friend of the gouty man, and would have been a better, had he permitted it, comes in for its full share of

calumny. It is true colchicum cannot now afford him the same certain and speedy relief that it did in the earlier stages of the disease; but the influence of the remedy is not lost from the length of time it has been given, or from any diminution in its curative powers, provided the same state of things existed as when this remedy was first prescribed; but it does not, for the organic changes which have resulted in the large vessels from the constant circulation of impure blood have rendered them, and with them, the ultimate capillaries, less sensitive to that purer condition of the blood which is induced by the depurative powers of colchicum. The best mode of administering colchicum in an ordinary fit of gout, is by giving the extractum colchici acet, combined with a small quantity of pil. hydrarg. and ext. taraxaci, combined with some brisk purgative, such as ext. coloc. comp., provided no tendency exists to piles; or it may be given with a small quantity of pil. cambogiæ comp. if the patient is a vigorous man, if not, a few grains of pulvis scammoniaë should be added to the above ingredients, and given in the form of pills at bed-time, to be followed in the morning by a warm aperient draught of rhubarb, scammony, manna, vinum colchici, &c., and we now find that when the chologogue influence of the col-

chicum is added to these aperients—which before, and without colchicum, only produced scanty evacuations, and gave the patient the stomach-ache—we get copious bilious evacuations, which, so far from depressing the patient, appear to relieve him from the nervous oppression and hypochondracism under which he has recently laboured. After this, Scudamore's mixture, composed of magnes. sulp., magnesi carb., and vinum colchici, should be given three times in the twenty-four hours for a couple of days;—of course regulating the doses of both the magnes. sulph. and vinum colchici according to the powers of the patient. Our object is to diminish the vascular plethora through the medium of the portal circulation, in order to remove that general visceral congestion which exists, and under which the kidneys are unable to eliminate the urates. The administration of Scudamore's mixture for two days will generally be sufficient for this purpose. After which, it will be only necessary to administer it every morning, so as to ensure daily action of the bowels, and maintain that less loaded state of the portal circulation which we have been at so much pains to remove; but we may now give the acetate or citrate of potass—the acetate is the best, provided extreme renal congestion does not exist—in fifteen or

twenty grain doses, combined with the vinum colchici. If there is congestion of the kidneys, to an extent sufficient to contra-indicate the administration of the acetate of potass, we must be content with the citrate in a state of effervescence, until we have relieved the overworked kidneys by the promotion of diaphoresis. Almost all the medicines which we use for the purpose of promoting cutaneous action, and which would be serviceable by the relief which their action would afford the congested kidneys, are contra-indicated, inasmuch as they diminish that tone of the mucous and nervous coats of the stomach which we are desirous of promoting; but the vapour, or hot-air bath may be used every night before going to bed, with great advantage, as by its aid a very large amount of nitro-carbonaceous impurities may be removed from the circulation, and that vascular plethora, which is so inimical to the action of the kidneys, is, by promoting free cutaneous action, soon diminished. The use of these baths should be followed by vigorous friction, and the patient should at once get into a warm bed.

From what has already been said on the treatment of gout, as far as relates to the alleviation of the paroxysm, it will be seen that there are two great indications to fulfil,—first,


to diminish vascular plethora, and the visceral congestion dependent on that plethora, with the least possible amount of depression to the nervous centres; secondly, to restore, if possible, to their full activity, all the great decarbonizing emunctories; as by so doing, we not only depurate the blood from the effete nitro-carbonaceous impurities with which it is loaded, but we raise the new albuminous principles of the chyle, which are constantly being poured into the circulation, to that more perfectly elaborated fibrin which is adapted to take the place of the worn-out muscular substances, which have recently yielded to the influence of the oxygen of the arterial blood during the process of secondary assimilation. It is unnecessary to say that the great essential ingredient for this purpose is good pure air. To talk to a man laid on his back with gout, in the very heart of this metropolis, of the great advantages to be derived from fresh air, may seem very like a mockery, when the article is not to be had within at least five miles of him; but we must not neglect to urge the importance of this essential point in the treatment of the disease, for we generally find that our patient has, without intending to do it, taken every precaution to deprive himself of the most powerful remedy he has, and the one to

which all others are subservient. We not unfrequently find him in a venerable four-poster, with a good fire burning, doors and windows closed, and bed-curtains drawn tight, for the ruling passion—a determination to make himself comfortable—still prevails even in this extremity; but in doing so he deprives himself of that air which, though not pure, is infinitely purer and better than the close pestiferous atmosphere he generates for himself by stopping all ventilation. I invariably make a point of placing the door wide open and opening the windows at the top, of course taking due precaution to prevent a draught of air from falling on the patient. One generally gets the credit of being a little mad, but a few words of explanation will suffice to convince the patient that there is a good deal of method in such madness. We have already stated that the great object of all medical treatment in gout is to establish a more healthy balance between supply and waste, and that this is to be attained not merely by reducing the amount of circulating blood and diminishing the quantity of the ingesta but by increasing the amount of oxygen inhaled, so that all the decarbonizing functions may be more perfectly carried on, the carbonaceous impurities burnt off, and the insoluble uric acid oxidized into the

more soluble urea. Two circumstances, however, militate against oxidation being carried on in that degree of perfection which will accelerate the cure of our patient. The first is, the impure state of the atmosphere he breathes (I speak of this metropolis), the second is his inability to accelerate respiration by exercise; but these difficulties may be obviated by means of modern science, which enables an invalid to sit in his easy chair and inhale from a pneumatic apparatus an atmosphere very largely surcharged with oxygen. There is nothing new in this treatment, but it has now been made much more available for the assistance of medical treatment than it has ever been before. It was first recommended and adopted some years ago by Dr. Beddoes, but although that gentleman had associated with him Sir Humphrey Davy as the chemist, and the celebrated James Watt as the designer and maker of his apparatus for the inhalation of the gas, still that apparatus, consisting as it did of furnaces, retorts, fire-tubes, purifiers, gas holders, hydraulic bellows, inhaling bags, &c. &c., was so complicated, that it was quite beyond the comprehension of the multitude, and he was compelled to abandon the practice, not from any want of confidence in the principle, but from

the difficulties which beset its application. But the difficulties which Sir Humphrey Davy and James Watt found to be insuperable, and which compelled Dr. Beddoes to abandon pneumatic treatment, have been overcome by the ingenious apparatus invented by Mr. Barth, while the advantages arising from pneumatic treatment generally, in all diseases attended with imperfect decarbonization of the blood, have been ably advocated by Dr. Birch. A man may now sit in his easy chair, and while he reads his paper inhale his oxygen as easily as he would smoke his pipe or sip his coffee. It is unattended by any sensation whatever except that of an agreeable exhilaration and flow of spirits, which is not followed by that subsequent depression which exists after the excitement occasioned by taking wine or alcoholic fluids. Of its applicability to the treatment of gout, and the great advantages to be derived from it, no one who reflects on the true nature of the disease can for one moment doubt. Gout is precisely the opposite state of the system to that which exists in starvation. The starving man takes in too little food and too much oxygen. In the starving man the oxygen of the inspired air, having consumed all the carbonaceous matters thrown into the circulation with the new

chyle, next acts on the hydro-carbonaceous supplies which have been laid up in the form of fat; and, having consumed these, the muscular tissues next succumb before the devouring influence of oxygen; as these become burnt up we approach the end; the particles of the brain begin to undergo the process of oxidation, and delirium, mania, and death then close the scene. Now precisely the reverse of this takes place in gout: the gouty man takes in too much food and too little oxygen; the hydro-carbonaceous elements of the blood are not burnt off, but deposited in the shape of fat in the intermuscular spaces as well as in the substance of the muscles, constituting fatty degeneration; the nitrogenous elements are not required in large quantities, for, owing to the little exercise the gouty take, there is but little waste of muscular tissue; the nitrogenous elements of food are therefore retained in the circulation, and not being wanted they have no alternative but that of yielding to the process of oxidation in the capillary circulation; but owing to this process being so feebly and inefficiently performed, from so small a quantity of oxygen being absorbed by the red globules under weak respiration, the oxidizing process of destructive assimilation ceases at uric acid, instead of, as when more efficiently performed, at



urea. Those blood changes then take place which we have already so fully considered, and which lead to the formation of urates and superphosphates in excess. It will be urged as an objection to the inhalation of oxygen gas, that an all-wise Providence has given us air containing a sufficient quantity of oxygen for all the ordinary purposes of life. True; but gout is not an ordinary or natural condition of the circulation; nor is the atmosphere we breathe in this large town the pure air of heaven as best adapted for the maintenance of life and health, but, comparatively speaking, a very impure, noxious, and deteriorated compound. If the filth of the Augean stables had not been the accumulation of ages, it would not have required a Hercules to remove it; if the nitro-carbonaceous impurities with which the circulation is loaded had not accumulated to the extent we find in gout; if the physical infirmity under which the gouty labour did not prevent their taking strong exercise to obtain more perfect oxidation of their blood; and if the comparatively impure air of this large town were not ill-adapted to that more complete and perfect oxidation which is essential to the recovery of the gouty, we should not require for them an atmosphere more highly charged with oxygen to

assist us in the cure. As it is, we have only to be thankful that modern science has enabled us to avail ourselves of so potent and innocuous a remedy. These facts must be patent and intelligible to every one; but if the confirmation of the highest scientific authority is required to support them, we have only to turn to the pages of Liebig, who says—"If the first condition of animal life be the assimilation of what is commonly called nourishment, the second is a continual absorption of oxygen from the atmosphere." "Viewed as an object of scientific research, animal life exhibits itself in a series of phenomena, the connexion and recurrence of which are determined by the changes which the food and the oxygen absorbed from the atmosphere undergo in the organism under the influence of the vital force." "All vital activity arises from the mutual action of the oxygen of the atmosphere and the elements of the food." "Waste in the animal body is a change in the state or in the composition of some of its parts, and consequently is the result of chemical actions. The influence of poisons and of remedial agents on the living animal body evidently shows that the chemical decomposition and combinations in the body which manifest themselves in the phenomena of vitality may be increased

in intensity by chemical forces of analogous character, and retarded or put an end to by those of opposite character, and that we are enabled to exercise an influence on every part of an organ by means of substances possessing a well-defined chemical action." "The first conditions of animal life are nutritious matters and oxygen introduced into the system. At every moment of his life man is taking oxygen into his system by means of the organs of respiration; no pause is observable while life continues." "At every moment, with every expiration, certain quantities of its elements separate from the animal organism, after having entered into combination within the body with the oxygen of the atmosphere."

"Since no part of the oxygen taken into the system is again given off in any other form but that of a compound of hydrogen and carbon—since further, in the normal state of health, the carbon and hydrogen given off are replaced by carbon and hydrogen supplied in the food, it is clear that the amount of nourishment required by the animal body for its support, provided its weight is to remain unaltered, must be in a direct ratio to the quantity of oxygen taken into the system." "An excess of food is incompatible with deficiency in respired oxygen,

but the quantity of oxygen inspired is also affected by the temperature and density of the atmosphere."

"The mutual action between the elements of the food and the oxygen conveyed by the circulation of the blood to every part of the body is the source of animal heat; all living creatures whose existence depends on the absorption of oxygen possess within themselves a source of heat independent of surrounding objects." "It is only in those parts of the body to which arterial blood, and with it the oxygen absorbed in respiration, is conveyed, that heat is produced. Hair, wool, or feathers do not possess an elevated temperature." "This high temperature of the animal body, or, as it may be called, disengagement of heat, is uniformly, and under all circumstances, the result of the combination of a combustible substance with oxygen." "It is obvious that the amount of heat liberated must increase or diminish with the quantity of oxygen introduced in equal times by respiration."

"The amount of oxygen capable of being taken up in the animal body in a given time is limited by the quantity of oxygen which can come into contact with the blood, and of the blood which can come into contact with the

oxygen. *The supply of the waste of matter and the amount of oxygen taken into the body in a given time, determine, in all seasons and all climates, the quantity of food necessary to restore the equilibrium.*"

"In many diseases substances are produced which are incapable of assimilation. By the mere deprivation of food these substances are removed from the body without leaving a trace behind; their elements have entered into combination with the oxygen of the air. From the first moment that the function of the lungs or skin is interrupted or disturbed, compounds rich in carbon appear in the urine, which acquires a brown colour."

*"Many, perhaps most, chronic diseases in man are caused by a misproportion, or a disturbed relation of equilibrium on the operation of the digestive and excretory organs, considered with reference to the lungs."*

"Retaining the familiar illustration of the furnace, every one knows that the accumulation of soot in the chimney, or the throwing on of an excess of fuel, interrupts the functions of the fire-place; that these causes act as would a stoppage of the grate below, through which the air has access."

"Over the whole surface of the body, oxygen

is absorbed, and combines with all the substances which offer no resistance to it." "Respiration is the falling weight, the headspring which keeps the clock in motion; the respirations and pulsations are the strokes of the pendulum which regulate it. In our ordinary time-pieces, we know with mathematical accuracy the effect produced on their rate of going by changes in the length of the pendulum, or in the external temperature. Few, however, have a clear conception of the influence of air and temperature on the health of the human body, and yet the research necessary to keep it in the normal state is not more difficult than in the case of a clock." "The view above developed, of the action of oxygen on the animal organism cannot be endangered in its truth by the usual relation of oxygen to fat, or to animal matters out of the body." "*But in the animal body we recognise as the ultimate cause of all force only one cause, the chemical action which the elements of the food and the oxygen of the air mutually exercise on each other.*"—(*Liebig's Organic Chemistry.*) Our treatment of gout should be, and in point of fact is, in accordance with the facts and principles here enunciated. The only precaution that it is essential to take before commencing the inhalation of an atmosphere

more highly charged with oxygen, is not to commence it before the congested state of the kidneys has been in some degree removed by the action of purgatives, diaphoretics, &c., in order that the free action of the kidneys may be equal to the removal of the large quantity of urea that is generated from the more rapid oxidation of the nitro-carbonaceous impurities with which the blood is loaded. The most appropriate diet for the gouty will form a subject for future consideration, when we enter on the preventibility of the disease. During the paroxysm we must, in the great majority of cases, reduce the diet both in quantity and quality; but no arbitrary rules can be laid down in these matters. Every case of gout is in itself a separate study, and I am compelled to admit that I have more frequently seen serious mischief ensue from the too sudden and complete abstraction of the ordinary stimuli, than I have observed to follow the continuance of a nutritious and even moderately stimulating dietary, in those who had been long accustomed to it. The plethoric over-fed countryman, whose gout is almost entirely the result of over-feeding, and whose blood, from the partial but imperfect ventilation to which it is exposed during insufficient exercise, in a pure atmosphere, will not only bear, but will require, in addition to a conside-

rable reduction in diet, hard purging. The *bon vivant* of fashionable life, whose blood is in a less pure state, and in whom there is not the same *vis vitæ*, will require more precaution in the adoption of any measures of a depressing character, while the attenuated literary man, whose gout is the result of weak assimilating organs, and deficient excretion, will frequently not only not admit of any great reduction in his diet, but will absolutely require the moderate exhibition of stimulants to maintain his enfeebled circulation, while we depurate his blood from the gouty impurities. We have in the one case to remember, that we have not an inflammatory disease to treat—that the patient does not require depletion, and that the amount of circulating blood only requires to be diminished to that degree which shall enable all the great decarbonizing functions to be carried on in their full integrity; while we have in the other case to bear in mind, that the circulating power, at all times feeble, is now especially unequal to the emergency, and although we must be careful not to add to the plethora of the circulation, we must maintain power by good wholesome food, and perhaps even a moderate amount of the least injurious stimulants, or we shall bring about that enfeebled condition of the circulation, under which metas-

tasis will take place to some internal organ, and in which the disease, if not productive of speedy dissolution, is very much less under control and amenable to treatment, than when in the extremities. These cases are especially benefited by the inhalation of oxygen, for they are more essentially the result, not of excess of food, but of deficient action of all the great excretory and decarbonizing organs; and by the inhalation of oxygen, while we at the same time promote the action of the skin and liver, we contemporaneously burn off the gouty impurities, and raise the new elements of the chyle to that higher degree of fibrination which is essential for new and healthy blood.

The experiments of Lehman have shown so conclusively that uric acid and urea are largely increased by an animal diet, and these experiments are so fully corroborated by experience of the disease, that no doubt can possibly exist as to the propriety of diminishing the amount of nitrogenous ingesta during an attack of gout. We have to bear in mind that the circulation is already surcharged with an excess of nitrogenous impurities, and that under the necessarily quiescent life an individual is leading during a paroxysm of gout, the wear and tear of the system is but slight. We also have to remember

that the supply has already exceeded the waste—hence the plethoric overloaded state of the circulation; and one of the principal objects in our treatment is the restoration of a healthy balance between supply of food and waste of tissue, and as supply already exceeds waste, we must, in order to attain that much-desired equilibrium, increase the waste while we diminish the supply.

By a judicious selection of food given in less but proper quantities, and at proper intervals, we cause the various processes of digestion, viz., chymification, chylification, and sanguification to be carried on in much greater perfection than when the digestive organs are overloaded, and we thus obtain a greater amount of nutrition and a less amount of nitro-carbonaceous impurities or gouty matter from a less amount of food. The practice of eating large quantities of bread and meat together, which is so prevalent in this country, and at the same time drinking freely of beer and wine, overtaxes the digestive organs, and, except where very strong exercise is taken, overloads the circulation with more nutritive materials than the wants of the system require. It is impossible to lay down rules adapted to every case; but in the first attacks of gout occurring in individuals in whom the powers of life are unimpaired, not only may all vinous, spiri-

tuous and fermented liquors be discontinued altogether for a few days with advantage, but entire abstinence from animal food should be enforced, and on resuming a meat diet, it should only be taken once a day, and then mashed potatoes or some other well-cooked vegetable should be taken with meat instead of bread. Ripe and juicy fruits may, from the large quantity of citrates, malates, and tartrates of potass which they contain, be taken with advantage, with bread in the place of meat.

In persons of feeble powers it is frequently desirable, while we diminish the amount of animal food, not to discountenance it entirely, but to restrict it to fish, mutton, and beef, prohibiting pork and veal. The same remark holds good with respect to those persons who, though originally strong, have had their constitutional powers undermined by repeated attacks. In the robust, the diet during the first few days of an attack should be restricted to fish, rice, sago, and tapioca puddings, with fruit. The drink should consist only of pure water or seltzer-water; if it be necessary, which it sometimes is, to allow a small quantity of wine, the best is good sound hock, as it contains less alcohol than any other wine, no grape sugar, and a large proportion of the vegetable salts of potass,

which are in some degree solvents of the gouty impurities. Where, however, an individual has been accustomed to a large quantity of stimulants, it is absolutely essential, in those cases where the sudden deprivation of it appears to give rise to great nervous depression, to allow a moderate quantity either of the accustomed stimulus or a glass or two of good, sound, dry sherry with each meal, until the depression arising from the absence of the usual stimulus ceases, from the measures which we adopt to render the blood purer and more stimulating to the nervous centres.

With regard to the treatment of atonic gout it becomes still more essential to be cautious in reducing the powers of the patient, either by placing him on too low a diet, or by allowing too long intervals between the meals, or by the administration of too strong medicines.

The great principle to act on, is to maintain the powers of life while we depurate the blood; and the skill of the physician is best evinced, not by the rash rapidity with which he attempts, and often fails, to relieve his patient, but by the certainty and safety with which he does so.

Convalescence from gout is generally rapid, but still seldom sufficiently so for the patient, who is impatient of the restraint which medical

surveillance entails, and anxious to resume his old habits. The best tonic is comparative rest; but patients are generally sceptical on this point, and we find considerable difficulty in inducing men who are addicted to the pleasures of the table to restrain their appetites within those bounds which the enfeebled digestive organs are capable of assimilating. The tone of the digestive organs may, however, be very materially promoted, and the purity and stimulating character of the blood be maintained and improved by appropriate remedies, provided moderation in diet, both as regards solids and fluids, is practised, and those general hygienic measures with regard to air and exercise pursued, which both science and experience have proved to be so beneficial, not only in restoring health and strength, but in affording immunity against a return of the malady. The most appropriate remedy in the convalescence from gout is the *infus. columbæ* as a vehicle for small doses of citrate of iron and potass—by this combination, given two or three times a day, after meals, not only is the assimilating power of the stomach improved, but the formation and accumulation of urate of soda in excess is prevented, while the amount of red globules or oxygen carriers of the blood is increased. Although the local treatment of gout

may not in all cases afford great relief to the patient, it will be found that mismanagement or mal-practice will be found to increase the severity of the pain and the risk of a fatal termination. The gouty limb should be elevated so as to favour the return of venous blood, and lint, steeped in a warm fomentation, made by dissolving as much bicarbonate of potass in decoct. papaveris as it will take up, should be kept constantly applied to the affected part, care being taken to keep it covered with oiled silk, to prevent evaporation, and the limb should then be enveloped in flannel. By this means, not only is the circulation in the affected part promoted, but a large quantity of the otherwise insoluble lithates are thus dissolved and removed from the joint, instead of remaining to form those gouty concretions or chalk stones which, by the impediments they offer to free motion, interfere with that exercise which is so essential to protect the patient from subsequent attacks of this malady. It would be superfluous in the present day to occupy time or space in condemning the impropriety of any cold applications,—in theory they are irrational, in practice diabolical. When the paroxysm has subsided, friction of the part with an ointment, consisting of about two scruples of potass iodide

to the ounce, should be practised two or three times a day. It is desirable to adopt this practice as soon as the state of the affected part will permit, as its success in removing morbid deposits becomes less as the fluids with which they have been deposited become removed and the earthy and saline matters alone remain. A small dose of the iodide of potassium may also be advantageously combined with the tonic medicine the patient may be taking during convalescence, not merely for the purpose of promoting absorption of the morbid deposits, but because it acts as a general stimulant on the capillary circulation, and promotes a more rapid metamorphosis of tissue than would otherwise take place in persons of weak circulation.

## CHAPTER VIII.

General observations on the prophylactic treatment, or the prevention of gout.

EVERY man is the conservator of his own health; but most men are utterly ignorant of the laws by which health is maintained, and they are likely to continue so while the ingenious youths of England devote their time so sedulously to dactyles and spondees and the not over chaste loves of heathen gods and goddesses, to the exclusion of almost everything that is useful. That knowledge of common things which has been so strenuously insisted on as a necessary part of the education of the poorer classes is quite as essential for their superiors. What is more common than loss of health? what more uncommon than anything like a moderate knowledge of those laws on which health depends? What is more common than the air we breathe? yet how few are acquainted with its composition, properties, or influence on animal life? What is more common than the great functions of circulation and respiration, on

the continuance of which, in their full integrity, not only health but life itself depends? yet how few are acquainted with the mechanical and chemical principles by which they are maintained? Every one rushed to see the machinery collected in the Great Exhibition in Hyde Park, containing, as it did, all the wonders in mechanism that this inventive age has produced; yet how few reflected—when looking on that machinery, remarkable either for its ponderous power or its minute delicacy—on the fact that they carried within their own breasts a self-acting pneumatic and hydraulic apparatus, which, in beauty of design, perfection of mechanism, and the exquisite adaptation of means to the end to be attained, far exceeded any of the works of men's hands which were contained in that vast emporium of the world's industry? When we consider that the action and function of the heart and lungs are continuous from the first breath we take till death closes the scene; when we reflect that these vital functions, although to a great extent independent of our will, yet accommodate themselves with the greatest resiliency to the various exciting and depressing emotions and emergencies with which we have to contend in our passage through life, we are compelled to admit the truthfulness and beauty of the words

of Holy Writ, which tell us "that we are fearfully and wonderfully made." The whole science of physiology abounds with phenomena, not only in themselves interesting as matters of study and observation, calculated to elevate the mind through the contemplation of nature's works to nature's God, but apart from these considerations the influence which a moderate knowledge of physiology would have in enabling men to avoid many of the causes of that class of diseases which may fairly be called "preventible diseases" is almost incalculable; and under these circumstances it may even be worth the study of those who are

" Called worldly by the world, a term implying,  
That they think more of living than of dying."

Life is but a lease, the duration of which is known to Him alone who gives, and not to us who hold it. But while it has been beneficently decreed that we are not to know the time at which we are "to shuffle off this mortal coil," still it has been mercifully ordained that the laws of nature should be so far unfolded by the light of science that we may be enabled to take precautionary measures to avoid many of those exciting causes of disease which we are constantly encountering in the conventional and artificial life we lead. No one can venture to

dispute the propriety of our availing ourselves of this knowledge, as it is the paramount duty of every man, whatever his station, to endeavour to be well that he may be useful.

“ What is a man,  
If his chief good and market of his time  
Be but to sleep and feed ?—a beast, no more,—  
Sure, He, that made us with such large discourse,  
Looking before and after, gave us not  
That capability and God-like reason  
To fust in us, unused.”

Many men will say that they cannot aspire to be useful members of society—they are content to be ornamental; disease, which is destructive of utility, is equally so of beauty. Health is the natural, disease the unnatural, condition of animal life. To be conversant with the phenomena of disease, we must first be acquainted with the laws of health. An acquaintance with the contents of some one or more of the best popular works on physiology and chemistry should form part of the education of every man. Apart from the interest which attaches itself to a knowledge of the laws by means of which “ we live and breathe and have our being,” it is surely worth something to know how to keep this mortal tenement of clay in a state of good and habitable repair, fit to discharge all the duties and appreciate all the pleasures of this

life; it is surely worth every man's while to know something of the laws on which health depends, and by the observance of which he may, at all events for a time, keep out the doctor and put off the undertaker. Now gout is one of those diseases which the physician may prevent, but he cannot do so by the aid of medicine alone. Men are constantly asking if there is no radical cure for the gout; they want a remedy which shall permit them to live at variance with the laws of nature, and suffer no inconvenience from doing so. It is needless to say that no such remedy exists or ever will exist. Medicine can do much, but not all. We must obtain, if we wish to keep men free from gout, their own aid and co-operation, by showing them, in a manner appreciable to themselves, how high living, sedentary habits, and deficient action of the various excretory organs lead to the formation of the gouty elements, and that condition of the circulation in which those elements become retained, accumulated, and ultimately deposited so as to constitute an attack; and we must show them how, by adopting certain precautions to ensure a more perfect action of the various excretory organs, and by taking certain remedies which shall prevent the formation and retention in the circulation of the

morbific matter of gout, the recurrence of the disease is to be avoided. But merely telling men they are not to do this thing, or eat and drink that, without showing them why, is bad policy; men are naturally anxious to do that which is agreeable to themselves, and the mere fact of their being told they are not to do a thing often stimulates and increases the desire to do it. The beef-eating, beer-drinking Briton, generally reasonable enough, becomes a most intractable individual the moment one attempts to interfere with his right to eat and drink as much as he pleases, and in defence of which he never hesitates to get drunk. The attempt to enforce the Maine Liquor Law in this country will never succeed. If the various temperance societies throughout the country are desirous of diminishing the public thirst for strong drinks, they can only do so by increasing the thirst for knowledge, and by showing men that there is no real nutriment in drink—that it is, when taken in excess, a delusion and a snare, destructive alike of body and mind, of purse and person. One volunteer is worth two pressed men, be the object to be achieved what it may; and it is only by convincing our patients, through the medium of their own intellects and judgment of the rational principles on which our

treatment is based, and on which their immunity from gout depends, that we can obtain from them that earnest and zealous co-operation which, while it ensures their freedom from their ancient enemy, elevates the reputation of the scientific physician to the highest point, and places an impassable gulph between him and the empirical impostor, who, ignorant alike of the disease he treats and the remedies he uses, tortures and robs his victim at one and the same time. In discussing the pathology of gout we saw that congestion of the liver was the first link in the chain of morbid events of which gout was the last; and we also saw that that congestion was the result of over-stimulation from excess of ingesta, no matter whether solid or fluid; for, although alcoholic beverages more rapidly induce congestion of the liver, that congestion is less frequently the precursor of gout than when the same condition arises from excessive eating, for large drinkers have, from the earliest periods, been noticed as small feeders. The jovial Sir John Falstaff and his rollicking companions are described as taking

“ But one halfpenny worth of bread  
To this intolerable deal of sack.”

Deep drinkers escape gout, not because they deserve it, but because the nervous powers of the

stomach are enfeebled by over stimulation; they have consequently no appetite, they eat but little and fail to accumulate that excess of effete and ill-assimilated nitrogenous matters in the circulation, which in those who eat more largely, as well as drink freely, is one of the principal causes of the malady. Moderation in eating, then, is one of the first great points to be impressed on all those who are anxious to avoid gout. Eating too much is a much more common excess among the upper and middle classes than drunkenness. The effects of drinking too much are sooner apparent, there is a stigma attached to it, and the process of getting sober is an extremely unpleasant one. But the gouty, although very often not drinking to drunkenness, habitually drink too much: they over-stimulate the flagging powers of the stomach by drink, and thus generate at one and the same time that congested state of the liver and that overloaded state of the circulation which form one of the chief causes of the disease. The observations of the late Dr. Prout, the most able chemical pathologist of the age, on excesses and errors in diet, appear to me to express so forcibly the necessity of restraining our appetites, that I venture to transcribe them; he says, "Reason is too little followed, the indulgence of the palate


is the sole object; so that the organs of digestion already enfeebled and incapacitated for the assimilation even of the most proper nourishment, are daily oppressed with a task for which they are altogether unequal. The consequence is, that though for a time the labour be sustained, the digestive energies are at length overcome. The dyspeptic being passes half his days in misery; his offspring inherit their parent's constitution, and if they persist in a like course of slow poison, after a few generations the race becomes extinct, 'his name even is cut off among men.' Providence has gifted man with reason, to his reason, therefore, is left the choice of his food and drink, and not to instinct, as among the lower animals; it thus becomes his duty to apply his reason to that object, to shun excess in quantity and what is noxious in quality; to adhere in short to the simple and the natural, among which the bounty of his Maker has afforded an ample selection, and beyond which, if he deviates, sooner or later he will pay the penalty."

Although in the strong and plethoric, a low diet is necessary during an attack of gout, it is not so during the intervals; moderation, especially if combined with strong exercise, is all that is absolutely essential, although there can be no doubt that total abstinence from wine or spirits,

where men will consent to forego their use, will repay them most abundantly by the greater purity of blood which results from the absence of the carbonaceous impurities with which they are loaded, and which by their retention in the circulation depress the powers of both mind and body. The main principle to be observed with regard to quantity in food, has been beautifully expressed by our great dramatist, where he says—

“Allow not nature more than nature needs.”

In other words, cease to eat for the mere gratification of the palate. The majority of those who eat too much, do so because they like the dish, not because they want the food. The next point to remember is, that there are idiosyncrasies of diet as well as of constitution, and that the old and vulgar saying of “what is one man’s meat is another man’s poison,” although not literally true, contains a great deal of truth. We as physicians are acquainted with general dietetic principles only, and it is not until after we have attended a man for some time, that we find out that he has some peculiarity of constitution in which the medicines and diet that we usually prescribe under such circumstances are totally inadmissible. Now, every man finds out these things, at all events as regards his diet, for himself, and he, too, generally disregards them. Nothing is more



common in society than to see a man help himself largely to a dish, with a degree of heroism—to use a hackneyed phrase—worthy of a better cause; while he says at the same time, “It is sure to disagree with me, it always does.” What is the use of advice to such a man as this?—a man who disregards the results of his own experience, is not likely to pay much attention to that of another. But the diet should not only be restricted to that quantity which appetite tells us is all that nature requires, but due regard should be had to the quality of the food; and this remark applies not merely to its digestibility, but to its chemical composition. Men who do not take strong exercise, and in whom there is consequently little muscular waste, require a less highly nitrogenised diet than those who live out doors, and are constantly engaged in pursuits requiring great muscular exertion. The lean of meat and bread are the principal sources from which we derive our supplies of nitrogenous aliment. When little exercise is taken, it is therefore advisable to take animal food but once a day, and then it should be eaten with well cooked vegetables instead of bread; at the other meals fish, bread, and ripe fruits, should take the place of meat. With regard to wine we should, as their noxious influence de-

pend on the quantity of alcohol and grape-sugar they contain, select those, when it is necessary to take any, which contain the smallest per centage of these ingredients. From a table compiled by the late Professor Johnston, it appears that the proportion of absolute alcohol by measure in our best known wine is as follows:—

	In 100 measures.
Port . . . . .	20 to 23
Sherry . . . . .	15 „ 25
Rhenish . . . . .	8 „ 13
Moselle . . . . .	8 „ 9
Madeira . . . . .	18 „ 22
Marsala . . . . .	14 „ 21
Claret . . . . .	9 „ 15
Burgundy . . . . .	7 „ 13
Malmsey . . . . .	16
Tokay . . . . .	9
Champagne . . . . .	5 to 15

The wines we commonly drink in this country, port and sherry, are, therefore, two or three times stronger than those of France and Germany. A large quantity of grape-sugar is contained in most wines, and gives to them their sweet taste and fruity character. Wines are commonly called dry when they contain little sugar. The order of sweetness in certain wines, as they are brought to the English market, is as follows (Jones):—

Claret, Burgundy, Rhine and Moselle wines, contain no sensible quantity of grape-sugar.

Sherry contains . . .	4 to 20	grains in the ounce.
Madeira . . . . .	6 „	20 „ „
Champagne . . . . .	6 „	28 „ „
Port . . . . .	14 „	34 „ „
Malmsey . . . . .	56 „	66 „ „
Tokay . . . . .	74	„ „
Samas . . . . .	88	„ „
Paxarette . . . . .	94	„ „

Port wine, as far as my experience extends, disagrees more with the gouty than any other; and it appears to be, in some measure, accounted for by its containing a very large amount of sugar as well as the largest per-centage of alcohol. Although champagne contains but a small per-centage of alcohol, it does not agree nearly so well with the gouty as the light French and German wines; this is explained by the fact of its containing a large amount of sugar, and by the lesser quantity of the vegetable salts of potass (citrates and tertrates) that it contains than those wines.

Of the French wines Burgundy is the most heating, and should be always avoided. Hock is perhaps of all wines the one that agrees best with the gouty: it contains but a small per-centage of alcohol and no grape-sugar. Liebig tells us that on the banks of the Rhine, where these wines are the ordinary and national beverage, gout is almost unknown; but we must not forget

that animal food enters less largely into the national diet than in this country.

Claret has obtained, though most unjustly, a bad reputation as a beverage for the gouty, on account of its supposed acescency; and I have often seen with regret men substituting brandy and water for claret and water or hock and water, in order to avoid the supposed acidity of claret. Let us hear what Professor Brand says on this subject:—

“The wines of Bordeaux are distinguished by a delicacy of flavour, and by a more perceptible combination of the acid with the vinous flavour (though *quite independent of acescency*) than is perceived in most other genuine vinous liquors; they are less heating and more aperient than other wines, and agree well with the stomach when taken in moderation; if in excess, they excite acidity and indigestion, often rather from the quantity than the quality.” These inconveniences which arise from excess, do not detract from its value as one of the least injurious wines for the gouty, when the requirements of society render it necessary that they should take wine of some kind; but when it is possible for those who are subject to gout to avoid wine or spirituous liquors altogether, it is in every respect desirable that they should do so. There is

no nutriment whatever in them, and the converting powers of the stomach are seldom so impaired as to render them essential to the digestive process. Where an individual is called on to make great and unusual mental or physical exertion, there can be no doubt that vinous and spirituous drinks, by their stimulating properties, invigorate for a time the failing powers, and enable men to complete, on emergencies, undertakings to which their strength, unaided by artificial stimulus, would be inadequate; but this is an extravagant expenditure of the vital powers: the man who thus overtasks himself, expends to-day the strength that belongs to the morrow, and is again obliged to seek—unless rest restores the balance—the aid of stimulants, to enable him to fulfil his daily task.

“The use of spirits,” says Liebig, “is not the cause but the effect of poverty. It is an exception from the rule when a well-fed man becomes a spirit drinker; on the other hand, when the labourer earns by his work less than is required to provide the amount of food which is indispensable in order to restore fully his working power, an unyielding inexorable law or necessity compels him to have recourse to spirits. He must work, but in consequence of insufficient food, a certain portion of his working power is


daily wanting. Spirits, by their action on the nerves, enable him to make up the deficient power at the expense of his body,—to consume to-day that quantity which ought naturally to have been employed a day later. He draws, so to speak, a bill on his health, which must be always renewed, because for want of means he cannot take it up; he consumes his capital instead of his interest, and the result is the inevitable bankruptcy of his body."

Now this inexorable necessity for alcoholic stimulants which arises in the over-worked man, cannot be urged as an excuse for the excesses which we often see the gouty commit; they are not over, but under-worked, and over-fed; and although stimulants for a time diminish that sense of oppression which arises from repletion and from an excess of impure blood, they ultimately increase it, for we have seen that the active principle of all stimulating drinks is alcohol, and that alcohol contains upwards of fifty per cent. of carbon, and as it is to the decarbonization of the blood that all our curative measures are directed, no further arguments can be required to convince those who would live without gout not merely of the desirability, but the necessity, of avoiding all fluids which contain any considerable quantity of an ingredient so

oppressive to the system, and which by its primary action over-stimulates, and by its secondary, debilitates the already enfeebled digestive organs. But we meet with men who suffer from gout, and who say in reply to all these strict injunctions with regard to their ingesta, that they are quite superfluous; they say, "I am temperate and even abstemious, but you see I still have the gout; it is true not so often or so severely as I had, but I am not exempt." We shall generally find in these men, notwithstanding their assertions, very frequently true, as to their moderation, that their habits of life are such as lead to that essential pre-existing condition, namely, excess of supply over waste, and consequent deficient oxidation of the blood.

In this class of persons this excess of supply over waste does not arise from excess of ingesta, but from deficient action of all the great excretory organs. They are generally men who lead sedentary lives, and whose minds are kept in a state of anxious tension by the pursuits in which they are engaged. We have seen that mental anxiety and sedentary habits, quite as much as high living, induce that congested state of the liver which is the alpha of that condition of repletion of which gout is the omega. We have seen how retained bile by its depressing influence


leads to that enfeebled circulation, in which the action of the heart and lungs becomes impaired and excretion diminished. Now I cannot profess to minister to a mind diseased, or to suggest a remedy for the removal of all those asperities which are inseparable from our lot in this life; but if men liable to gout will not take that exercise in the open air which is the best means of insuring the action of all the great decarbonizing emunctories, they must adopt artificial means for the removal from the circulation of the nitro-carbonaceous impurities with which the blood is loaded, or they must, by permitting them to remain and clog the mechanism of life, be content to bear with the gout. Most men think if they pay a daily visit to the Temple of Cloacina that they have done a great thing for themselves and something for their country; many neglect even this slight devotion at the shrine of health, and very few are aware that even in a state of health only one eighth portion by weight of the food and drink they swallow is thrown out of the system by the bowels; in that constipated state which occurs before an attack of gout, considerably less than one eighth the normal proportion is given off in this manner, and as the skin and lungs are acting but feebly, it cannot be a matter of surprise that that redun-



dantly plethoric state of the circulation shortly ensues, in which the overworked kidneys soon participate, and the portal by which the gouty impurities escaped being closed, they become deposited in those structures for which they have an affinity, wherever that quiescent and retarded state of the circulation exists, that is favourable to their deposition. We must endeavour to counteract, or rather to prevent this state of the circulation, not only by moderation in diet, but by our general prophylactic treatment. We have seen that under strong exercise the amount of perspiratory fluid exhaled from the skin of an individual is three times as great as when he is at rest, and with this increased exhalation of water from both the skin and lungs, there is an increased elimination of carbonaceous materials from both these organs. The liver no longer has to do their work as well as its own; it secretes and excretes the bile, whereby the natural peristaltic action of the bowels is promoted, and the blood depurated from the carbonaceous impurities which the retained bile is constantly carrying into it.

Although literary, professional, and mercantile life cannot be entirely divested of those anxieties which are inseparable from them, and as much time cannot be devoted to out-of-door exercise as

is essential to the preservation of perfect health, still some exercise can and must be taken by those who are desirous of avoiding that condition of the circulation most favourable to the development of gout. Men may walk briskly to and from their place of business, they may daily practise some strong exercise in the open air, so as to raise the new elements of their blood to that condition of animalisation which shall fit its materials to be incorporated with the living tissues, and at the same time by the increased absorption of oxygen ensure the reduction of the effete albuminous structures into that soluble state in which they may be carried off as urea, and they may by the occasional use of purgatives, combined with small doses of colchicum, assist the action of their naturally torpid livers, and thereby prevent that congested state of that organ which is the precursor of all those ills from which the gouty suffer. To effect this object, small doses of colchicum should be given at bed time for a few days consecutively, combined with small doses of blue pill and extract of taraxacum made into pills, with scammony or gamboge, according to the powers of the patient. Aloetics, or all purgatives which contain them, such as the Ext. Coloc. Comp. are better avoided on account of the irritation of the rectum which generally



exists, and which they increase. The first four doses of purgative medicine are very frequently followed by tenesmus and a sensation of sinking, and the patient is very often anxious to discontinue them; such, however, should not be permitted, as this is the most conclusive evidence of that congested state of the portal circulation which it is our object to remove. The purgative pills taken at bed time should be followed up in the morning by a mild dose of magnes. sulph. in combination with bicarb. of potass. A steady persistence in this plan of treatment, aided by a well regulated diet and sufficient exercise to produce free cutaneous action without occasioning exhaustion, will generally remove that acrid and scanty condition of the alvine excretions which indicated the necessity for their use; and we may then, when we have fairly removed that congested state of the portal circulation which is so inimical to absorption, prescribe such solvent and diuretic remedies as shall promote a more speedy solution and removal of the urates from the circulation, but from which we should have derived little or no benefit so long as that congested state of the portal, hepatic, and renal vessels existed. The vegetable salts of potass in a high state of dilution then become our most valuable remedies; the acetate of potass may be pre-

scribed in small doses, on first rising in the morning, in combination with very small doses of iodide of potass, and just sufficient colchicum to maintain the action of the liver; or where there is much tendency to dyspepsia, the citrate of potass may be given in a state of effervescence in some mild bitter effusion; and if an ænemic condition of the circulation exists, a few grains of the citrate of iron may be added to the draught. The iodide of potassium appears to promote capillary circulation, and a more rapid metamorphosis of tissue than otherwise takes place in the gouty; the colchicum, by its gently-stimulating action on the liver, prevents a recurrence of that congested condition of the liver which we have just been at such pains to remove; and the citrate of potass, given in a high state of dilution so as to ensure its absorption, becomes converted into a carbonate, and acts as a solvent for any slight excess of uric acid that may have been formed, and which, from its insolubility, has been unable to escape from the circulation. Many men are in the first instance fearful of continuing the use of colchicum so long as is necessary under this prophylactic treatment; but they need be under no apprehension in this respect; it is not a cumulative poison, and may, in these small doses, be given

for years without losing its powers or occasioning any unpleasant consequences. Where colchicum fails is the last stages, where a gouty condition of the blood, prevailing for years, has at last led to organic changes in the great vessels; and its failure is not then attributable to its having lost its power, but the organic changes which have taken place have entirely altered the circumstances. Colchicum, to the last, by its action on the capillary circulation of the liver, would and does promote the oxidation of the blood; but the ætheromatous deposits in the large vessels have deprived them of their resiliency, and they accommodate themselves less rapidly to the stimulus occasioned by a purer state of the blood than they did before these changes occurred. A steady persistence in this plan of treatment not only protects a man against gout, by preventing the formation and accumulation in the circulation of that morbid matter which is the cause of the disease, but by the increased purity of blood which results from this treatment not only is nutrition of the various organs of the body more efficiently maintained, but those structural changes in the heart and great vessels which result from the constant circulation of that impure blood which exists in the gouty, and which in the great majority of in-

stances are the cause of their death, are avoided. Many men say, "I cannot bear this restraint—let me dine every day, and have the gout twice a-year." Unfortunately, the gout cannot be held on this tenure; the half-yearly attacks soon come quarterly, they are more protracted though less painful, and under a persistence in the habits which induced them, they are at last seldom absent. Moreover, the restraint is very slight; it can surely be no great punishment to be restricted from those sweets and made dishes, and stimulating drinks, or that excess of animal food, which a healthy appetite does not require, which the stomach cannot digest, and the wants of the system do not demand; and it surely is the very reverse of restraint to live as the gouty always should do, as much as possible sub-Jove. Men have told me, "I have tried strong exercise and I have tried abstinence, but instead of doing any good I had the gout immediately." Men who endeavour to accomplish any object, are seldom successful by beginning at the wrong end. In the first part of this treatise, when endeavouring to explain how a paroxysm of gout takes place, I pointed out, that even when the system is saturated with the morbid matter of gout, an attack did not take place, so long as a balance was maintained between the propelling

power of the heart, and the quantity of blood to be propelled throughout the system, but that the paroxysm generally takes place during the heavy sleep which followed some protracted mental exertion, or an unusually heavy debauch, as under the heavy sleep which succeeds either of these circumstances, circulation and respiration are less vigorously carried on, the decarbonization of the blood less perfectly effected, and that languid and oppressed state of the circulation induced which is most favourable to the deposition of the gouty matter.

Fasting or exercise, carried to the extent of producing exhaustion, when the circulation is loaded with gouty impurities, produce the same result. Men who have had gout brought on in this way, have practised abstinence and exercise at the wrong time, and in the wrong manner. Gout does not require fasting—simply moderation; but to practise fasting or take exercise to the extent of producing exhaustion at the very time the circulation is loaded with gouty matter, is the very way to induce an attack. These men evidently felt the premonitory symptoms; but, ignorant of the necessity of taking measures to maintain a moderate degree of power, while they used such remedies as should depurate the blood from the gouty matter with which it

was loaded, have carried exercise and abstinence to an extent that has produced prostration, and thus expedited the paroxysm they endeavoured to avoid. When men from age or infirmity are unable to take sufficient exercise between the paroxysms to ensure the removal of the carbonaceous impurities from the circulation, and to raise the nitrogenous portions of the chyle to that higher stage of fibrination by the complete oxidation of the blood, we may add to these remedial measures already suggested the daily inhalation, by means of Mr. Barth's apparatus, of an atmosphere more highly charged with oxygen; in fact it is more especially in those cases where age or infirmity deprive us of the depurative power that is obtained through exercise in the open air, that we must, in addition to the means already suggested, endeavour to assist and imitate nature in promoting the action of the skin and lungs, by means of the vapour bath and the inhalation of oxygen gas. I have already stated that the maxim first promulgated by the celebrated Dr. Mead, "That the gout was the only cure for the gout," was as dangerous as it was delusive; it is dangerous because it is by no means certain that the habits of excess which are indulged in too frequently by those who  
from the premonitory symptoms of gout,

and which are sometimes so intolerable as to induce them, acting on this paradox, to increase their excesses with the view of bringing on a paroxysm, will be successful in attaining it. Apoplexy and paralysis are not unfrequently the result of these misdirected efforts to regain health; but if those who foolishly hope to get well by indulging in the very excesses which cause the malady escape for a time these fatal results, and are successful in attaining their object by bringing on a paroxysm of gout, which for a time frees the circulation of gouty matter, they are still slowly but surely laying the foundation, by the constant formation and circulation of impure blood, of those organic changes which will sooner or later be destructive of life. It is for these reasons a dangerous doctrine, and it is a delusive one, because it induces men to neglect those precautionary measures, by means of which alone both the disease itself and the organic changes resulting from it may be avoided.

While, therefore, I can confidently and conscientiously affirm that no man need suffer from the gout, who will steadily adopt those rational means which science and experience have proved to be so effectual in preventing the formation, accumulation, and retention in the circulation of that morbid matter which is the cause of gout,

and without which it cannot occur; and while I am enabled to add that that tonic and depurative plan of treatment, which is directed to the fulfilment of this object, so far from enfeebling the powers of the individual adopting it, does, on the other hand, by the greater purity of blood which it insures, invigorate the tone of both mind and body, and prevents the premature formation of those organic changes to which the gouty are liable, I am compelled in justice to those who would rely on medicine alone, without any modification of their habits of life, to admit the poverty of medicine, and to deplore with them that

“The ills that they themselves procure,  
Must be their schoolmasters.”

THE END.

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